Fluidic Sciences

User Instructions for Fluidity™ One-M

Instrument instructions for use

Released July 2025



Intended use

Fluidic Sciences products are designed to be safe in accordance with the operating instructions. If the equipment is not used in the manner specified in the operating manual the equipment may be impaired and warranty may be voided, warranty exclusions include:

- Damage caused by improper operation
- Repair or modification done by anyone other than Fluidic Sciences or an authorized agent
- Damage caused by accident or misuse
- Damage caused by disaster
- Corrosion due to use of improper samples

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The Fluidity One-M instrument characterizes protein interactions, including the determination of affinity (K_D), size, concentration, and stoichiometry. The instrument is intended to be used by trained, laboratory staff within an analytical laboratory environment.

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Manufacturer

Fluidic Sciences Limited
27 Jarman Way, Royston, SG8 5HW, United Kingdom

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1. Introduction **5**

Related documents 5

2. Declaration of Conformity **6**

3. Safety information **7**

Hazard summary 7

Ventilation and air extraction 7

Precautions 7

Manual handling 8

Personal protective equipment (PPE) 8

Training 8

4. Specifications **9**

Technical specifications 9

Operating environmental requirements 9

Storage environmental requirements 9

Instrument features 10

Status indicator 10

5. Fluidity One-M theory of operation **11**

Purpose 11

System description 11

Chip-plates 12

6. Pipetting technique **13**

Equipment 13

Volume 13

Dispensing technique 13

Inspecting chip-plates 14

Measurement errors 14

7. Installation **15**

Instrument packaging 15

Transportation and handling 15

Preparing the instrument 15

Dimensions and operating space 16

Connections 17

8. Operation **18**

Start instrument 18

Start use 18

Instrument settings 19
Connect WIFI 20
Creating a Fluidity Insight user account 20
Opening chip-plate foil pouches 21
Preparing chip-plates 22
Pipetting onto chip-plate 24
Loading chip-plates 25
Software on screen symbols 26
Run instrument 27
Set up *Size measurement* run 28
Set up *Binding check* run 37
Set up K_D *determination* run 44
Set up *Custom import* run 51
Managing Results 58
Search results 59
Filter results shown by preset 60
Order results shown by time 61
Export results 62
Delete results or templates 65
Add, delete or change result notes 67

9. Troubleshooting Guide 70

10. Cleaning and decontamination 71

11. Service, maintenance, and fault repairs 71

12. Decommissioning and storage 72

1. Introduction

This user guide gives an overview of the system operation of the Fluidity™ One-M instrument and detailed information for use of the instrument components. All users must familiarize themselves with the safety guidelines and general operation information sections of this manual prior to use. If the equipment is used in a manner not specified by the manufacturer, the warranty may be voided.

Related documents

- IFU-002 - Fluidity One-M chip-plate package insert
- IFU-003 - User guide for Fluidity Insight

2. Declaration of Conformity

We **Fluidic Sciences Ltd** of **27 Jarman Way, Royston, Herts, SG8 5HW, UK** in accordance with EN 17050-1:2010 and the following Directive(s):

2014/35/EU	The Low Voltage Directive
2014/53/EU	The Radio Equipment Directive (RED)
2011/65/EU	The Restriction of Certain Hazardous Substances in Electrical and Electronic Equipment Directive
2014/30/EU	The Electromagnetic Compatibility Directive and its amending directives

Hereby declare that:

Part Number	Description	Serial Number Range
F1M001	Instrument	F1M-001 to F1M-099

and all associated accessories are in conformity with the applicable requirements of the following documents:

Ref. No.	Title	Edition/date
EN ISO 12100	Safety of machinery — General principles for design — Risk assessment and risk reduction	2010
EN 61010-1	Safety requirements for electrical equipment for measurement, control, and laboratory use. General requirements	2010
EN 61326-1	Electrical equipment for measurement, control and laboratory use. EMC requirements	2013
EN 61000-6-1	Electromagnetic compatibility (EMC). Generic standards. Immunity for residential, commercial and light-industrial environments	2007
EN 61000-6-3	Electromagnetic compatibility (EMC). Generic standards. Emission standard for residential, commercial and light-industrial environments	2007
EN 300 330-2-1-1	Radio equipment in the frequency range 9 kHz to 25 MHz	2017

EU Authorised Representative: Grant Instruments Europe B.V.
Strawinskylaan 411
WTC, Tower A, 4th Floor
1077 XX Amsterdam
The Netherlands

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced specifications. The unit complies with all applicable essential requirements of the Directives. The technical file is available from the manufacturer at the address below.

Signed by: .....

Name: Andrew Lovatt

Position: Director

Done at Fluidic Sciences Ltd

27 Jarman Way, Royston, Herts, SG8 5HW, UK

On 23rd July 2025

CE

3. Safety information

Hazard summary

The following hazards are present on the Fluidity One-M instrument:

	The operator must not remove any covers or open any electrical enclosures, or power supply units, on or supplied with the machine. **WARNING:** Risk of electrical shock and damage to the equipment. Keep liquids away from the power supply unit (PSU).
	The Fluidity One-M contains automatically controlled moving mechanisms and a fan. These do not present a danger to users provided the unit is not opened or misused. **WARNING**: Do not operate the Fluidity One-M with the covers removed

Ventilation and air extraction

The instrument does not remove particles from the air drawn into the enclosure. If this instrument is being used with hazardous reagents circulating within the enclosure that could pose a risk to the user, the instrument must be operated inside a laboratory fume hood.

Precautions

Avoid contamination while running instrument and handling chip-plates, which may cause erroneous results.

WARNING: All biological specimens and materials with which they come into contact should be handled as if capable of transmitting infection and disposed of with proper precautions in accordance with local regulations. Never pipette by mouth. Avoid specimen contact with skin and mucous membranes.

CAUTION: Exercise standard precautions when obtaining, handling, and disposing of potentially hazardous reagents.

Take care to avoid cross-contamination during all steps of this procedure, as this may lead to erroneous results.

Use powder-free gloves whenever possible to minimize introduction of powder particles into instrument, sample, or chip-plates.

Manual handling

The Fluidity One-M weighs 35 kg and should be carried by two people.

CAUTION: Apply the appropriate level of care when lifting to avoid injuries.

Personal protective equipment (PPE)

Personal protective equipment (PPE) must be worn relevant to the reagents and samples present.

Training

Equipment must be operated by trained personnel. Please contact your Fluidic Sciences representative or distributor sales representative for guidance on user training.

4. Specifications

Technical specifications

Parameter:	Data:
System configuration	Benchtop system, internal computer
Connections	Ethernet port, and wireless ethernet (WiFi)
Dimensions (length, width, Height)	58.5 x 43.2 x 49.5 cm
Weight	35 kg
Power supply unit (PSU)	100 to 240 VAC, 50 to 60Hz, 5A, 24V DC output Mains supply must be grounded: +/-10% rated voltage
Power consumption	120 Watts

NOTE: Plug the power cable into a suitable grounded fused power outlet. Only use the power supply and cable supplied with the unit. IEC cable (power cable) is considered a disconnect device and must be accessible.

NOTE: Make sure the instrument is installed away from other equipment which may give off excessive heat, e.g., fridges, freezers, refrigerated centrifuges, thermal cyclers, ovens, radiators, etc.

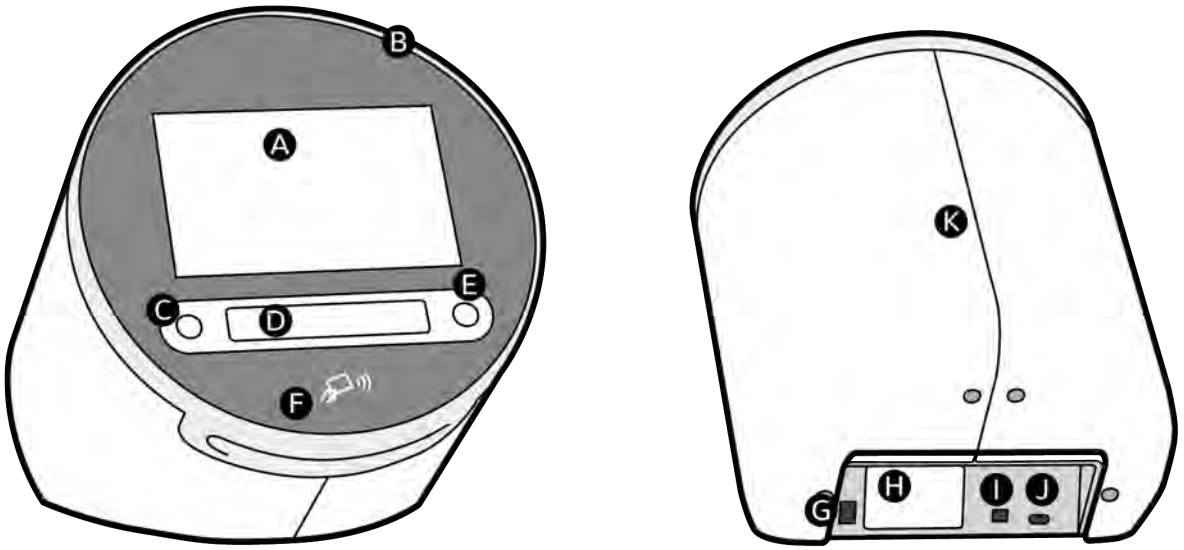
Operating environmental requirements

Parameter:	Data:
Operating temperature	15 °C to 30 °C
Relative humidity	10% to 80%, noncondensing
Altitude	Sea level to 2,000 meters
Instrument noise level	< 55 dBA

Storage environmental requirements

Parameter:	Data:
Temperature	0 °C to 40 °C
Humidity	0% to 95%, noncondensing
Altitude	Sea level to 5,000 meters

Instrument features



Position:	Feature:
A	Touch screen interface
B	Light ring status indicator
C	USB port
D	Chip-plate loading drawer
E	Drawer button (open-close)
F	Near Field Communication (NFC) reader
G	Power switch – turn ON (I), or OFF (0)
H	Instrument label
I	Ethernet port
J	Power port
K	WiFi

Status indicator

Colour:	Pattern:	Explanation:	User Action:
None	None	Instrument ready to use	Set up run
White	Spinning	Instrument initialising	Wait
White	Pulsing	Instrument running	None
Green	Solid	Run complete	Remove chip-plate
Red	Pulsing	Run error	Restart instrument
		Instrument initialising error	Contact technical support

5. Fluidity One-M theory of operation

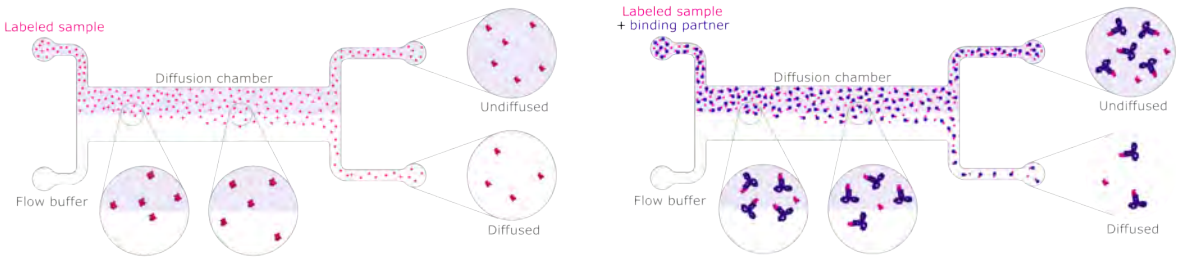
Purpose

The Fluidity One-M characterizes proteins and their interactions in solution, working with challenging samples such as intrinsically disordered proteins and multiprotein complexes and in complex solutions such as serum, plasma or cell lysate. The instrument functions by measuring the size (hydrodynamic radius) of a fluorescently labeled protein by evaluating the sample's diffusivity in a microfluidic channel. This information can be used directly where size is of interest, for example in quality control situations. Protein-protein interactions can be interrogated by monitoring the size of a probe molecule against a titration of a binding partner. Along with the binding affinity, the sizes of the free and complexed probe species are determined. This data aids in understanding binding stoichiometry and quality of the initial probe. If the concentration of the binding partner is unknown, whether because the partner is present in a complex sample such as serum or because the partner is heterogeneous with only a subpopulation being able to bind, assays carried out on the Fluidity One-M will reveal both the binding affinity of the probe for its target and the concentration of that target in the sample. This can be used in immunology to gain a deeper understanding of the humoral response, in neuroscience to understand the mechanism of action of antibody drugs against amyloid fibrils, or to determine expression levels of membrane protein receptors.

System description

The Fluidity One-M is a mechanical, microfluidic, and optical system that enables the sizing of proteins and other biological molecules, exploiting the diffusion gradient that exists across two laminar fluid flows.

At the heart of the system is the microfluidic chip that enables reagents to be introduced at two inlet ports which are then drawn through the chip to the outlet ports by the Fluidity One-M instrument. The channel arrangement takes the shape of an 'H' where the sample and running buffer are introduced to co-flow and then separate into diffused and undiffused ports. For a set pressure, temperature, and viscosity, the average distance diffused in the central H section is uniquely defined by size for a fixed chip geometry (resistance and diffusion channel length, height, and width). The system is designed to have 8 circuits on a chip and 3 chips in a chip-plate that has the same footprint as a standard 96 well plate for ease of automation integration.



Each circuit is independently controlled so a user can run from 1 to 24 samples at the same size setting (e.g., an 8-point binding curve in triplicate), where a sample contains a fluorescently labeled molecule and optionally a confirmed or putative interaction partner.

Chip-plates

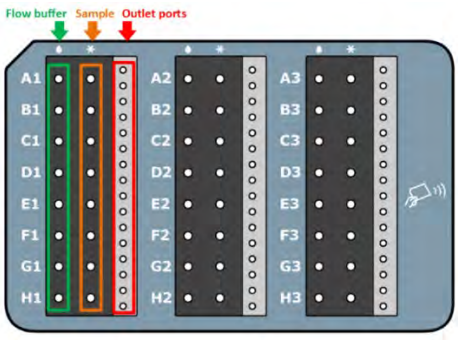
Chip-plates are injection molded plastic consumables, made of acrylonitrile butadiene styrene (ABS), cyclic olefin polymer (COP), and thermoplastic elastomer (gasket material).

Chip-plates are used to characterize protein interactions, including the determination of affinity (K_D), size, concentration, and stoichiometry. The chip-plate consists of 3 fixed chips containing 8 microfluidic diffusion sizing circuits each, allowing the measurement of 24 data points per chip-plate. Each microfluidic circuit is treated with an anti-adhesion coating to minimize protein binding to the internal surfaces of the chip. Reagents applied to the inlet wells will capillary fill the circuit eliminating the risks of air entrapment and the formation of bubbles.

The instrument controls the extent of microfluidic diffusion by adjusting the suction applied to the outlet ports, and hence the residence time in the diffusion chamber. The fluorescence intensity of the labeled probe species collected within each outlet port enables the Fluidity One-M to calculate the hydrodynamic radius (R_h).

4 µL of flow buffer and 4 µL of sample must be pipetted into the corresponding wells.

- A lower volume will lead to erroneous results or failures because the wells run dry.
- A larger volume will lead to overflow and incorrect insertion of the sample onto the chip. If overflow occurs, use the next position on the chip-plate.



CAUTION: Never pipette reagents into the outlet ports, or measurements are likely to fail. Always wear gloves while handling chip-plates, and place on provided cover/stand when loading. Fingerprints, oil, dust, etc., may cause imaging failures or produce erroneous results.

NOTE: Chip-plates must be disposed of in the same manner as other biohazardous laboratory waste. All circuits may only be used once. The status of the chip-plate can be queried using the NFC reader. See page 21.

6. Pipetting technique

NOTE: It is important to use the recommended pipetting technique to achieve proper results.

Equipment

- Type of pipette: Air displacement micro-pipette
- Pipette tip: Standard pipette tips are recommended

Volume

The wells require 4 µL loaded volume.



- Too much – risk of overflow and contamination
- Too little – the microfluidic circuits will not be adequately primed

Dispensing technique

If using a multichannel pipette check consistency of volume across all tips before dispensing. Check the alignment of the pipette tips with the wells of the chip-plate before dispensing.

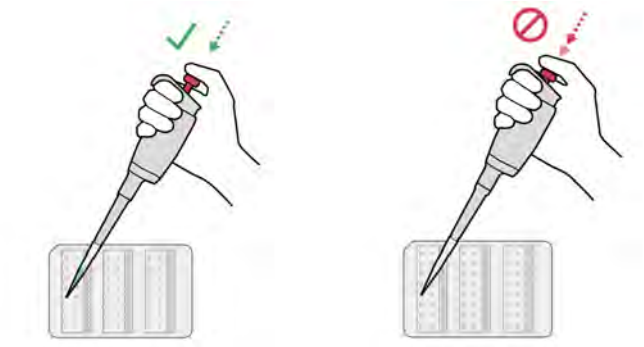
NOTE: Follow steps carefully to make sure no bubbles are caught in the tip.

When dispensing the liquid:

1. Press down to first stop while the pipette is not in the liquid
2. Insert tip into liquid and slowly release plunger
3. Insert tip into destination port on chip-plate
4. Press the plunger to the first stop to dispense the liquid, using a steady and continuous action.

NOTE: A small dead volume must be left in the tip.

5. Discard the dead volume with the tip



CAUTION: Do not use the **second stop** when dispensing the liquid as it will create bubbles in the well ("blow-out" technique).

Inspecting chip-plates

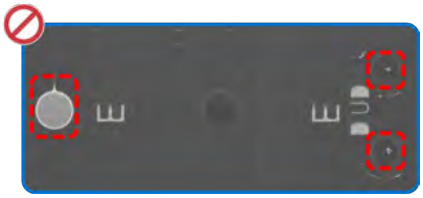
Measurement errors

Circuits and wells may be visually checked after the run to confirm correct operation. Wet circuits are visually darker than dry circuits.

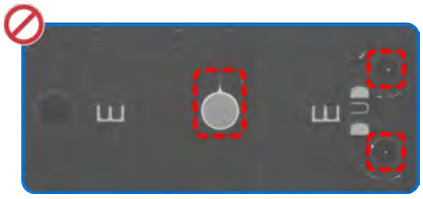
Example



After the run both outlet ports must contain liquid and be free from any air bubbles. There must also be some fluid left in both the flow buffer and sample buffer wells.



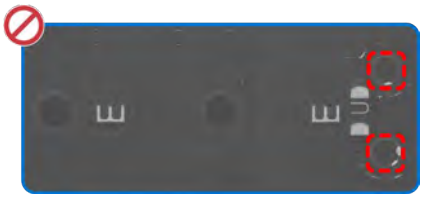
Flow buffer well is dry, and air bubbles in the outlet ports. Air is drawn into the outlet port from an empty flow buffer well: Make sure that sufficient volume (4 µL) is loaded in the flow buffer well.



Sample well is dry, and air bubbles in the outlet ports. Air is drawn into the outlet port from an empty sample well: Make sure that sufficient volume (4 µL) is loaded in the sample well.



Low viscosity sample, run at high viscosity setting. Flow buffer and sample wells are dry and air bubbles are present in circuit, and in outlet ports: Lower the viscosity setting. See viscosity table on page 28.



High viscosity sample, run at low viscosity setting. Flow buffer and sample wells are full and outlet ports are partially filled. The light reflection can help estimate the fill heights: Increase the viscosity setting. See viscosity table on page 28.

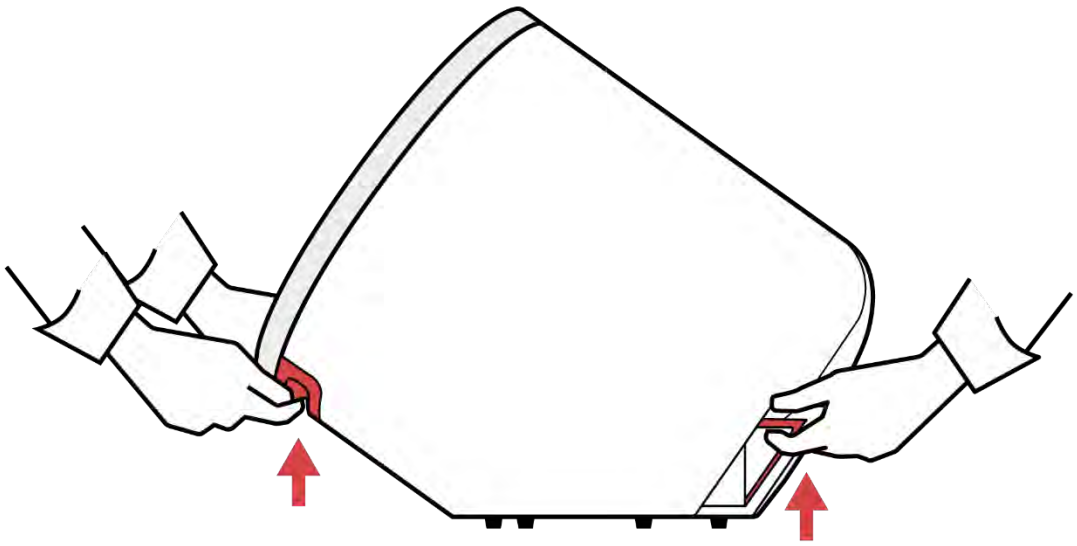
7. Installation

Instrument packaging

The instrument is shipped in a wooden crate with foam lining and soft cover for protection during shipment.

Contents of the crate: instrument, USB Flash Drive, Ethernet cable, IEC Power cable (appropriate for the region), power supply unit (PSU), User guide for Fluidity One-M (IFU-001), User guide for Fluidity Intelligence (IFU-003).

Transportation and handling



Lift the instrument carefully from the back and front handles.

WARNING: To avoid injury, two people are required for lifting the instrument.

NOTE: The packaging is designed to be reused; if you require transport of your instrument, please contact customer service. Your crate and packing materials will be shipped back to Fluidic Sciences after installation.

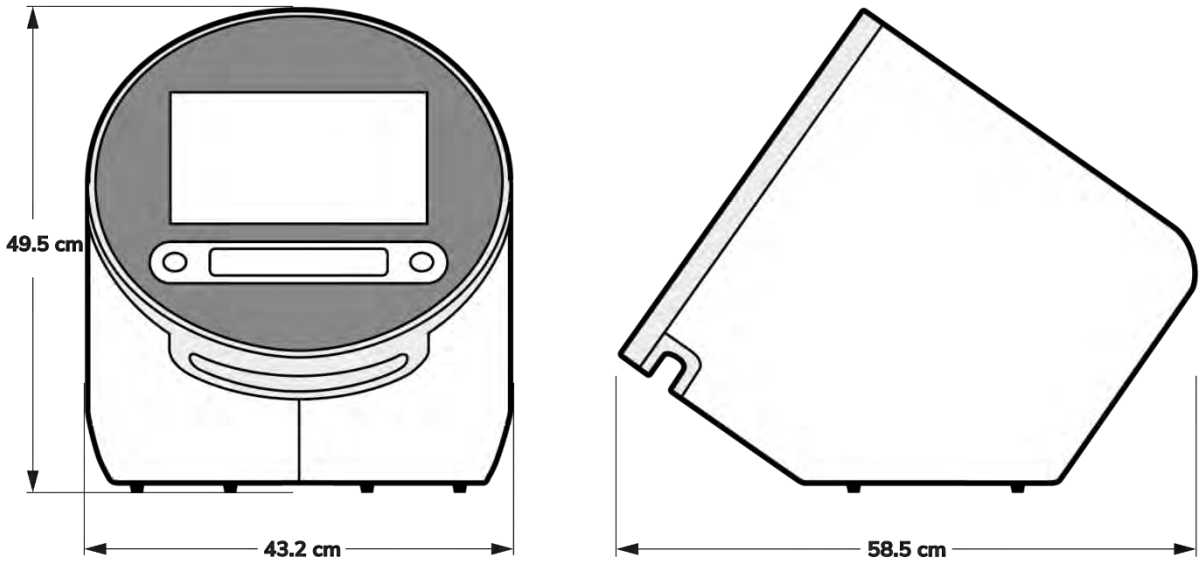
Preparing the instrument

1. Remove the instrument from all outer packaging
2. Make sure that the transportation plate located within the instrument chip-plate loading drawer is removed
3. Make sure the instrument is placed on a clean, secure, flat, level, and dry work surface.
4. Check the instrument to ensure there is no packaging material present

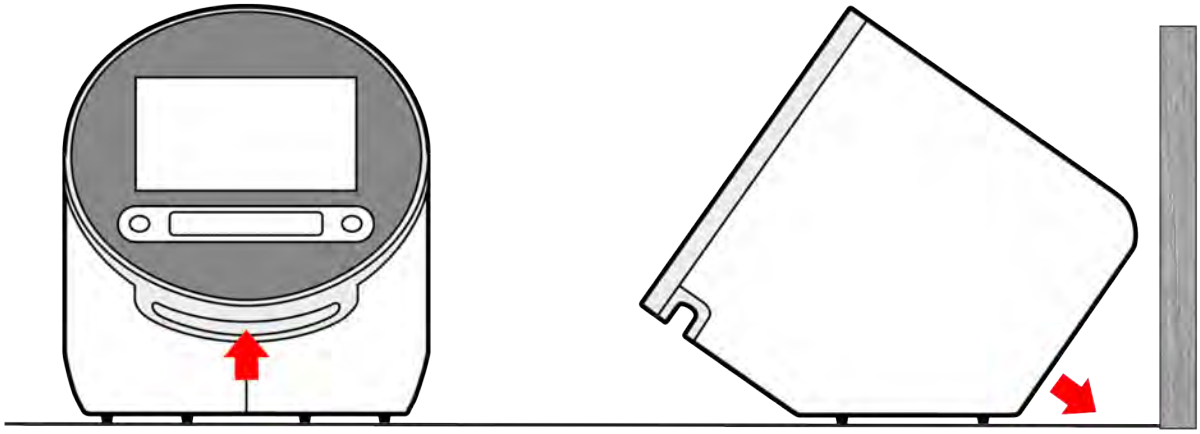
NOTE: If the instrument has been stored in a cold location, after unpacking the instrument from the shipping crate leave the instrument at ambient temperature for > 1 hour before switching on.

CAUTION: Do not place the Fluidity One-M adjacent to instruments that could cause excessive vibrations, such as centrifuges, vortex mixers, etc.

Dimensions and operating space



Instrument dimensions: 58.5 D x 43.2 W x 49.5 H cm.

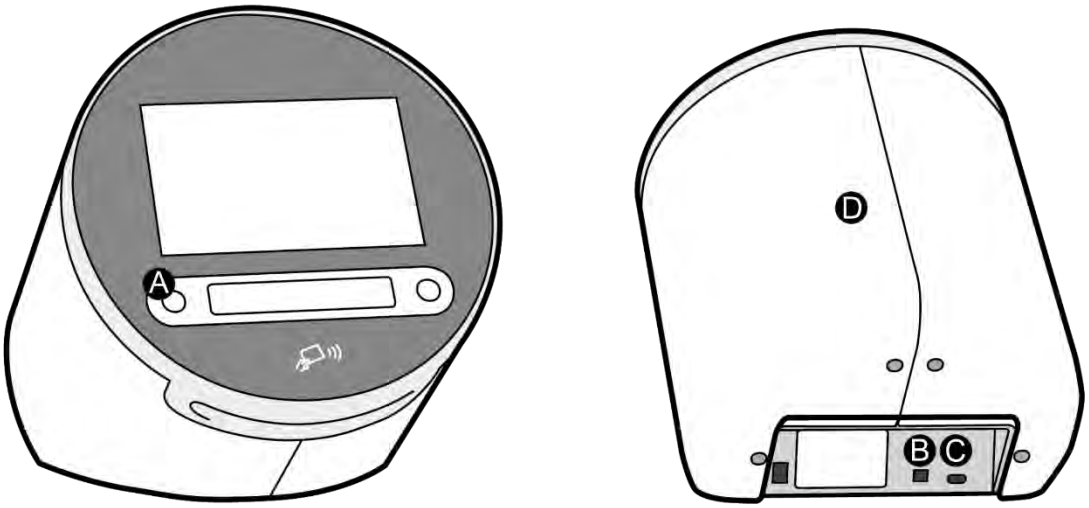


The Fluidity One-M has been designed to operate on a laboratory bench. The instrument must be positioned with sufficient space to allow access to the power switch and power port at the rear of the instrument.

NOTE: Do not obstruct the air vents for the instrument located on the front and back handles.

Connections

The Fluidity One-M connections are made as shown below:



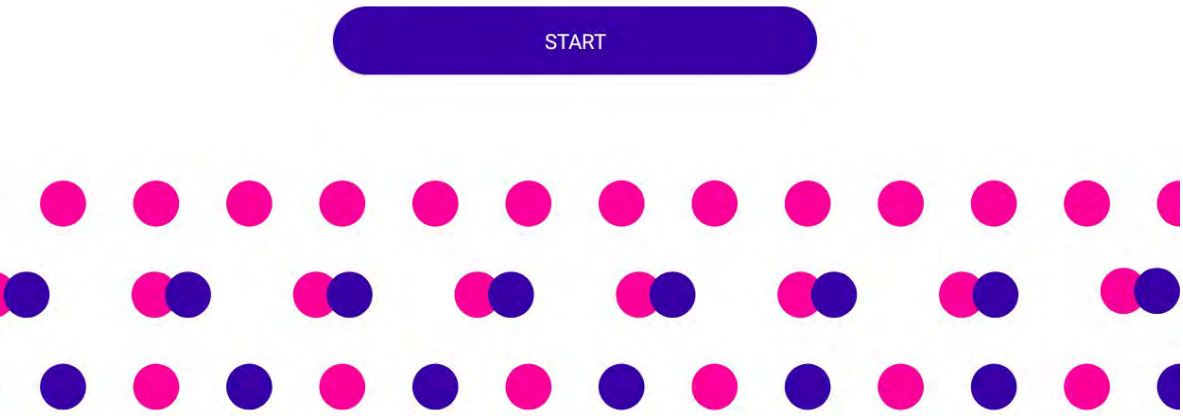
Position:	Features:
A	USB port for importing templates and exporting results files
B	Ethernet port for connection to a network
C	Power port – use only the power supply unit (PSU) provided with the instrument. Must be plugged into a grounded power outlet
D	WiFi for wireless connection to a network – (circuitry located inside enclosure, settings are accessed through software). See connectivity sub-section.

8. Operation

Start instrument

1. Press the power switch on the instrument back panel to the ON (I) position. While the instrument initializes a series of splash screens will briefly appear.
2. Allow the instrument to initialize

Start use



1. On the touch screen select the *START* button

   The run list screen appears, and the navigation menu defaults to open.

   NOTE: The navigation menu is available regardless of which screen is open. It can be opened or closed by touching the logo on the upper left side of the touchscreen.



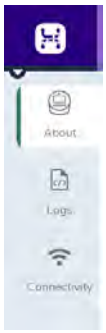
OPEN

CLOSED

Instrument settings



1. Open navigation screen
2. Select Instrument icon



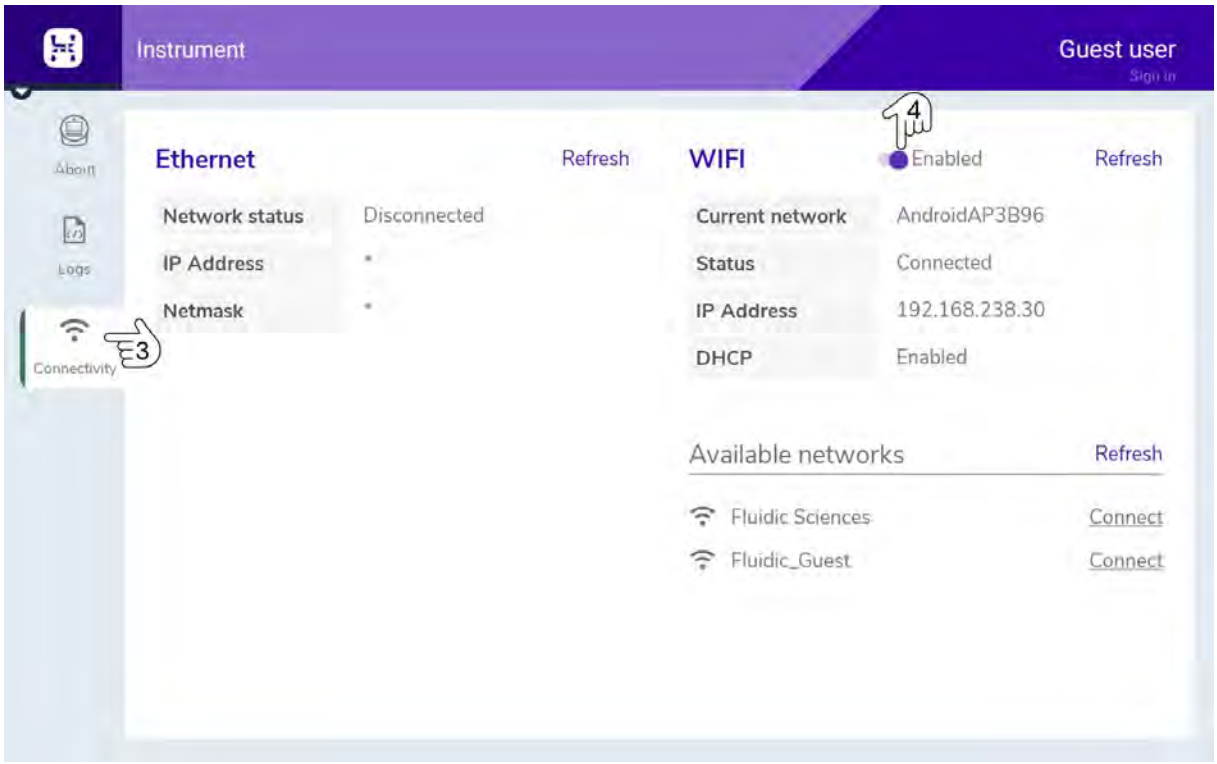
3. The following options are available:

- About: Serial number, software version, and firmware version
- Logs: download instrument logs
- Connectivity: Network status, DHCP, IP address, Netmask, WIFI, available networks

Connect WIFI

The instrument has network connectivity currently only for diagnostic and service use by Fluidic Sciences representatives.

1. Open navigation screen
2. Select *Instrument* icon



3. Select *Connectivity* icon
4. Enable WIFI (if not already enabled)

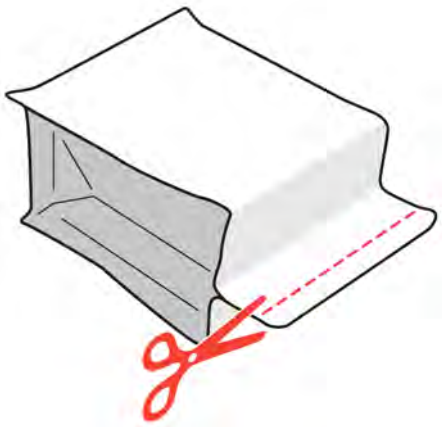
Creating a Fluidity Insight user account

For Fluidity Insight user account setup contact your sales team or techsupport@fluidic.com: For guidance on using Fluidity Insight refer to the document User guide for Fluidity Insight IFU-003.

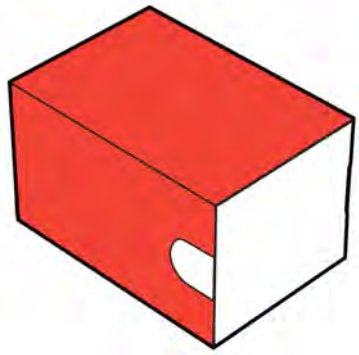
Opening chip-plate foil pouches

Chip-plates are shipped in sealed, oxygen free foil pouches for stability in storage. Use all contents within three months after opening the foil pouch. The chip-plates can be stored at room temperature once opened.

CAUTION: Do not use chip-plates after the use-by date on label, or beyond three months after opening the foil pouch. Results cannot be guaranteed if chip-plates are used past their expiration date.

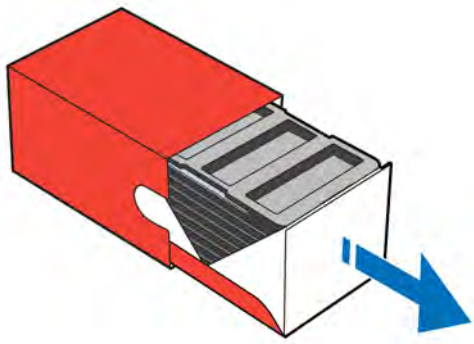


1. Cut the foil pouch open along the indicator marks and remove chip-plate box.

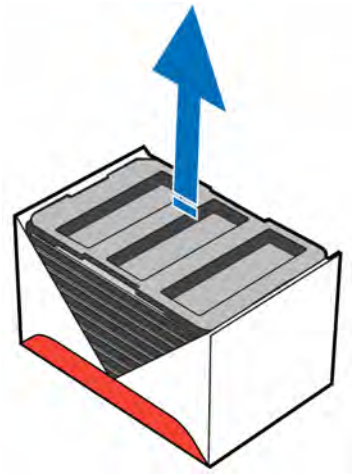


1. For reference, record the date of opening the foil pouch on the side of the chip-plate box in the space provided.

Preparing chip-plates



1. Slide open the cover of the chip-plate box and remove the shipping plastic bag to access chip-plates. Dispose of plastic bag and oxygen scavenger pouch and return chip-plates to box.

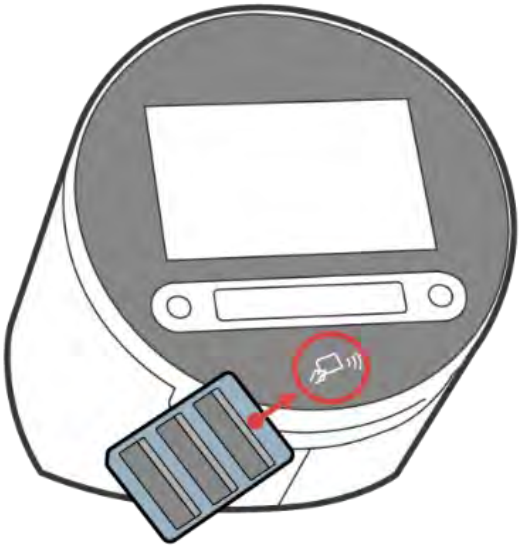


2. Remove the top cover from the stack
3. Place the cover onto a clean flat surface. Avoid touching the surfaces of the microfluidic chips.
4. Remove the first chip-plate from the stack and place on top of the cover

   To use a previously part-used chip-plate hold the chip-plate near the NFC reader to detect which wells are available.

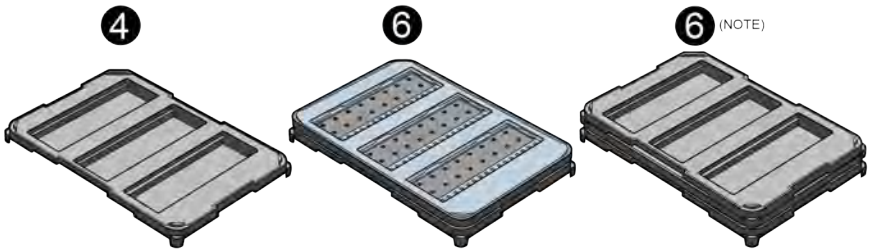
   A window appears on the instrument touchscreen showing chip-plate well status information:

   - All wells available
   - Subset of wells available
   - Chip-plate fully used
   - Chip-plate expired



5. When chip loading is complete return the cover to the top of the stack. Store all unused chip-plates in the chip-plate box to minimize contamination and close the cover of the chip-plate box when not in use.

CAUTION: Always wear gloves while handling chip-plates. Fingerprints, oil, dust, etc., may cause imaging failures or produce erroneous results. Use powder-free gloves whenever possible to minimize introduction of powder particles into sample or chip-plates.



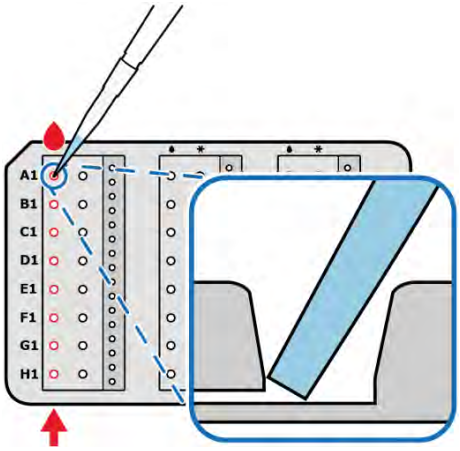
Position:	Description:
4	Cover on flat surface
6	Chip-plate on cover
6 (NOTE)	Second cover on chip-plate for protection

NOTE: The second cover may be used to cover and protect a chip-plate when it is removed from the packaging. Due to the small sample volumes used chip-plates should be loaded with fluids only when ready for measurement in the Fluidity One-M, and in all cases measured within five minutes of loading sample.

6. Store chip-plates in a clean, dust-free environment once removed from the packaging

Pipetting onto chip-plate

1. Prepare the chip-plate as instructed on the instrument touch screen

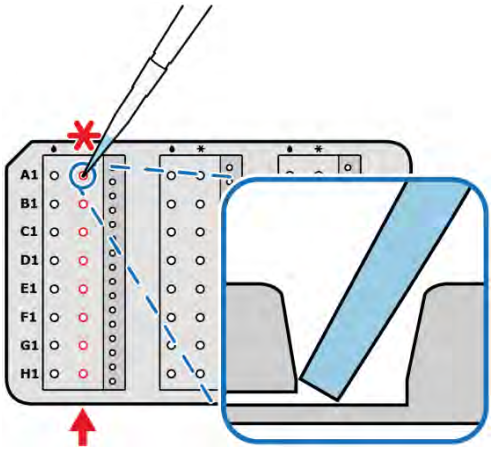


2. Locate flow buffer wells marked
3. Position tip inside well at bottom
4. Press pipette plunger to first stop to dispense as described above in section 6. Pipetting technique. Repeat 2 to 4 for desired circuits

   NOTE: A small dead volume must be left in the tip. This method is required to avoid introducing bubbles into the circuit and is essential for proper priming of the circuit.

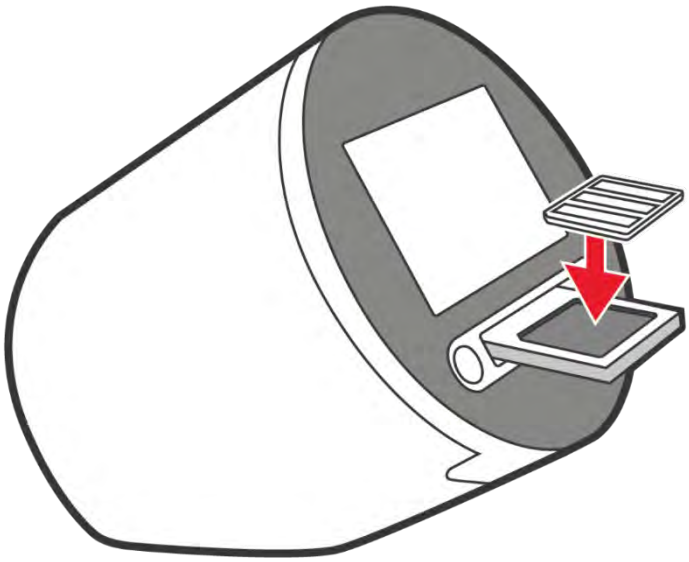


5. Wait 1 min and 30 sec for the circuits to prime



6. Locate sample wells marked *
7. Position tip inside well at bottom
8. Press pipette plunger to first stop to dispense
9. Repeat 6 to 8 for desired wells

Loading chip-plates



CAUTION: DO NOT touch the surface underneath the chip-plate.

To load a chip-plate:

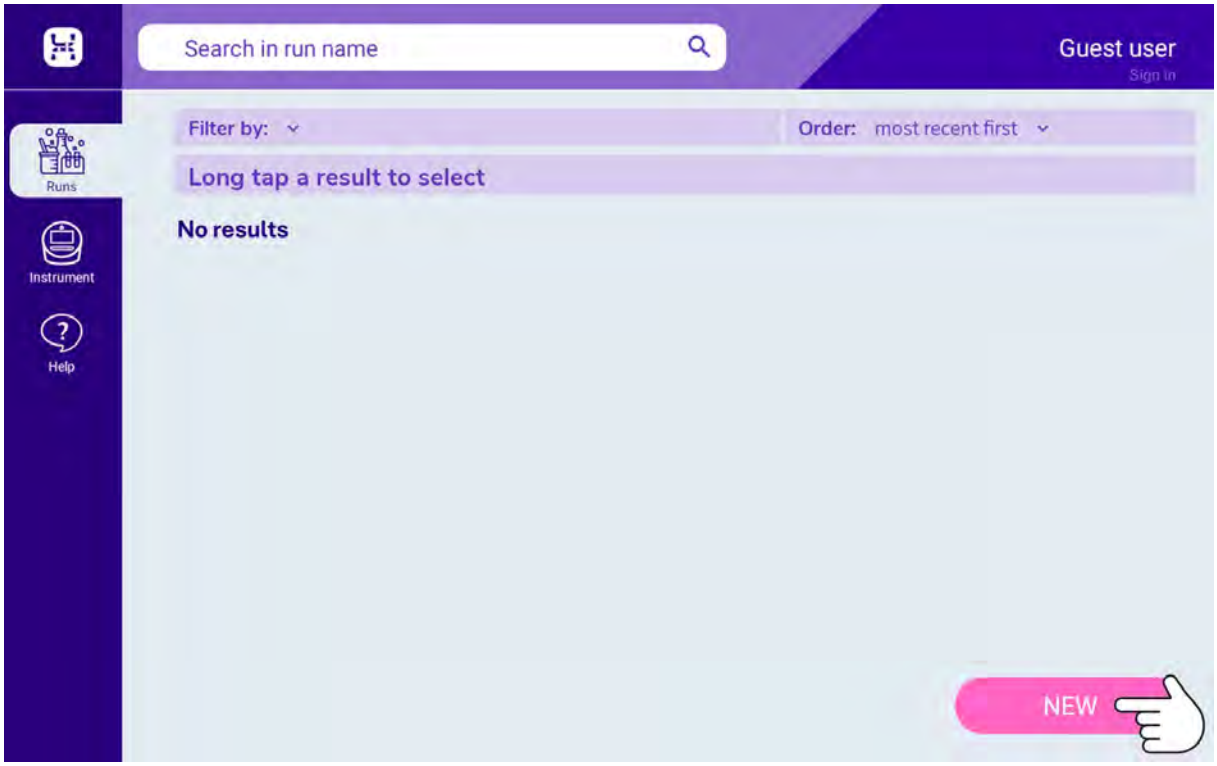
1. Press drawer button to open
2. Put the chip-plate face-up into the drawer > match the notched (A1) corner of the chip-plate with the notch in the drawer
3. Make sure the chip-plate is fully seated
4. Press drawer button to close

CAUTION: The chip-plate must not be removed until the run has completed.

Software on screen symbols

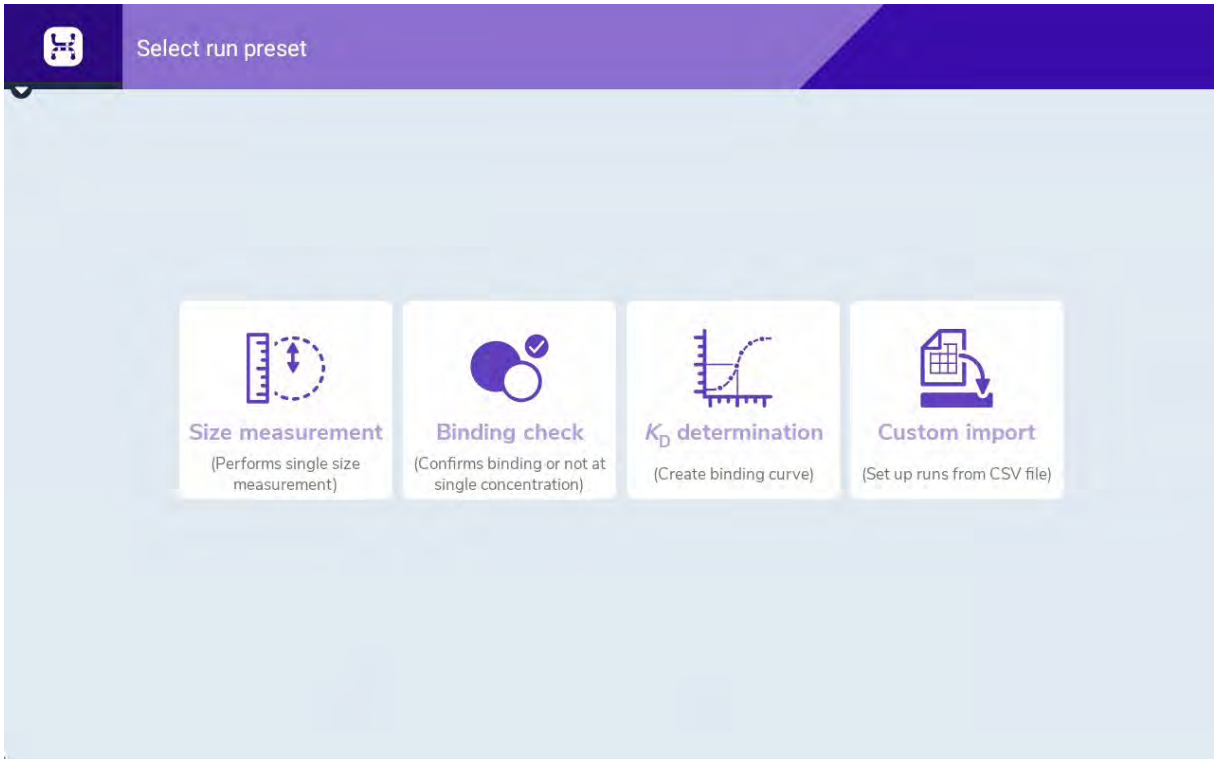
Symbol:	Description:
	Fluidic Sciences logo opens the navigation menu
	Access the run list page. This shows all runs on this instrument by the signed in user
	Access the instrument page, where user can view the status related to the instrument, such as connectivity, logs, etc.
	Opens the help function
	Access and add notes to a run
	Access results of the run where available
	Repeat a run; this creates a clone of the run so it can be repeated or adjusted prior to re-starting
	Start a *Run*
	Size measurement, size measurement of a single sample containing a labeled probe with or without unlabeled target.
	Binding check, determines whether an interaction occurs between a labeled probe and unlabeled target using three repeats.
	K_D determination, for interaction between a labeled probe and unlabeled target using several data points - generate a fitting curve
	Custom import, allows any 24 size measurements of your choice, via import of a CSV file using a Fluidic Sciences provided template
	This indicates a circuit that can be selected for a run
	This indicates the first circuit that was selected for a run
	Indicates a circuit that will be measured during the run but isn't the first one
	Success indicator
	Indicates that the chip-plate does not have enough free wells

Run instrument



NOTE: If this is a new instrument the *Runs* list will be blank.

1. Select *NEW* to create a new run



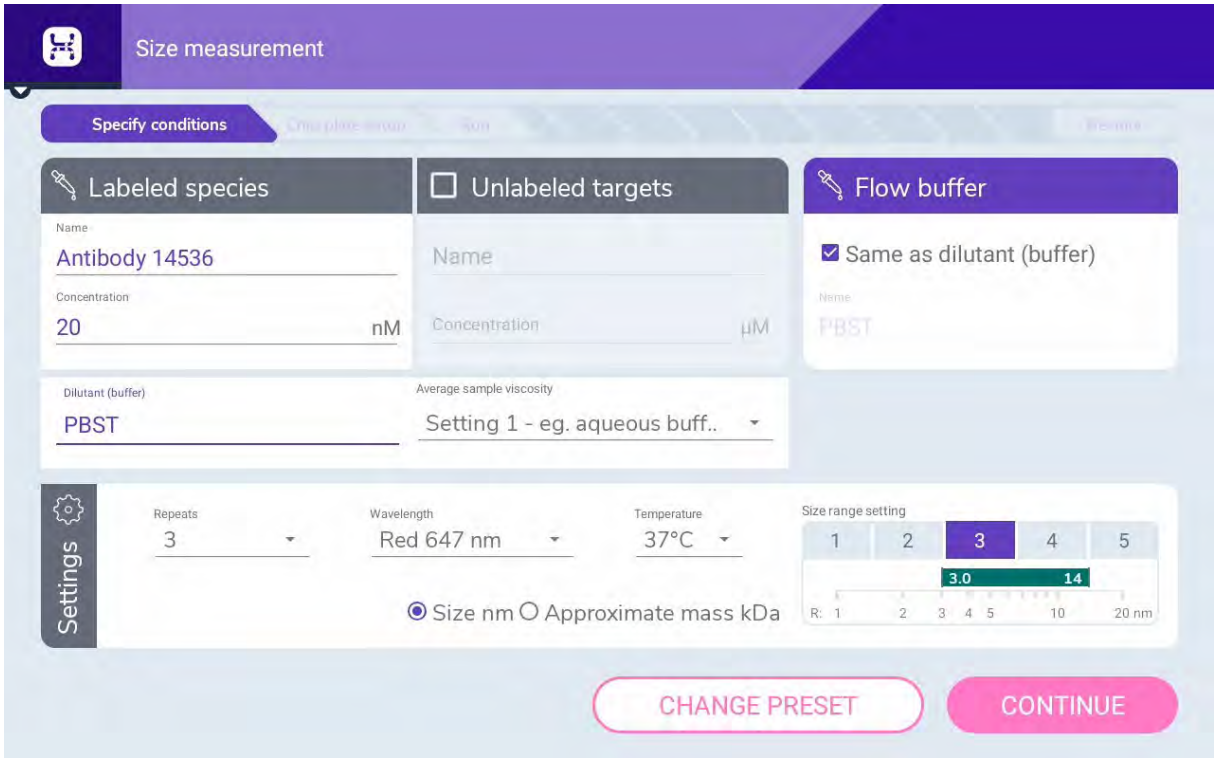
2. Select a *run preset* on the instrument touchscreen > go to the corresponding heading for instructions:
    - Set up *Size measurement:* size measurement of a single sample containing a labeled probe with or without an unlabeled target. See page 28.

- Set up *Binding check*: determines whether an interaction occurs between a labeled probe and unlabeled target using three repeats, displaying the average size of the labeled species and the complex in a table highlighted in green (which means binding occurs) or orange (meaning no binding or that one or more circuits have failed). See page 37.
- Set up K_D *determination:* quantify K_D between labeled probe and an unlabeled target using several data points - generate a fitting curve. See page 44.
- Set up *Custom import:* allows any 1 to 24 sample measurements of your choice, via import of a CSV file using Fluidic Sciences template. See page 51.



NOTE: An on-screen numeric keypad or keyboard will appear when touching the text fields.

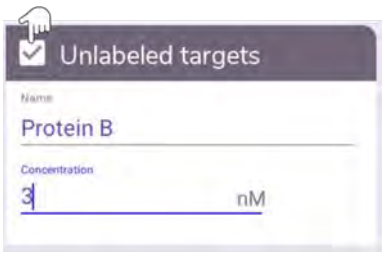
Set up *Size measurement* run



1. Under Labeled species > enter a *Name* for the sample
2. Under Labeled species > enter a *Concentration* > select units (mM, µM, nM or pM)
3. Under *Flow buffer* > enter buffer name
4. Under Average sample viscosity > select a viscosity setting from the dropdown menu; see table for viscosity range selection:

Setting:	Minimum Viscosity:	Maximum Viscosity:	Glycerol (v/v):	Potential sample / flow buffer type:
1	0.82 cP	1.08 cP	0 to 6%	Water, and standard buffer
2	0.95 cP	1.22 cP	2 to 9.5%	Glycerol
3	1.23 cP	1.62 cP	9.5 to 18%	Pure serum, and plasma
4	1.34 cP	1.73 cP	13 to 20%	Higher viscosity serum, and plasma

NOTE: Samples should be diluted with a diluent of comparable viscosity to the sample itself. For serum or plasma samples Fluidic Sciences has developed a suitable matching buffer; please contact us for details.



Add an unlabeled target only if looking at an interaction between an unlabeled target and a labeled probe, otherwise continue with step 6.

5. Select the check box next to Unlabeled targets (optional)
    a. Under *Name* > enter a Name for the unlabeled target.
    b. Under *Concentration* > enter a Concentration > select units (mM, µM, nM or pM).
6. Under Repeats > select number of repeats from drop-down menu

    NOTE: Minimum of 3 repeats are recommended, up to a maximum of 24.
7. Under Flow buffer > select the check box Same as dilutant (buffer)
8. Under *Flow buffer* > enter a *Name* for the *buffer* (optional)

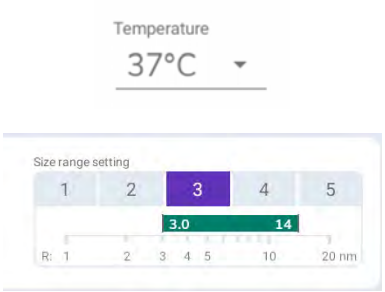
    NOTE: It is recommended to use the same type of buffer for the flow as the sample dilutant buffer.

Sample type:	Recommended wavelength:
Complex / biological matrix(i.e., cell lysate, serum, etc.)	Red 647nm
Purified proteins in buffer	Green 488 nm or Red 647nm

9. Under *Ex. Wavelength* > select a wavelength

    NOTE: Select a wavelength compatible with your fluorophore dye. Red (647nm) dyes are recommended for measurements in serum.

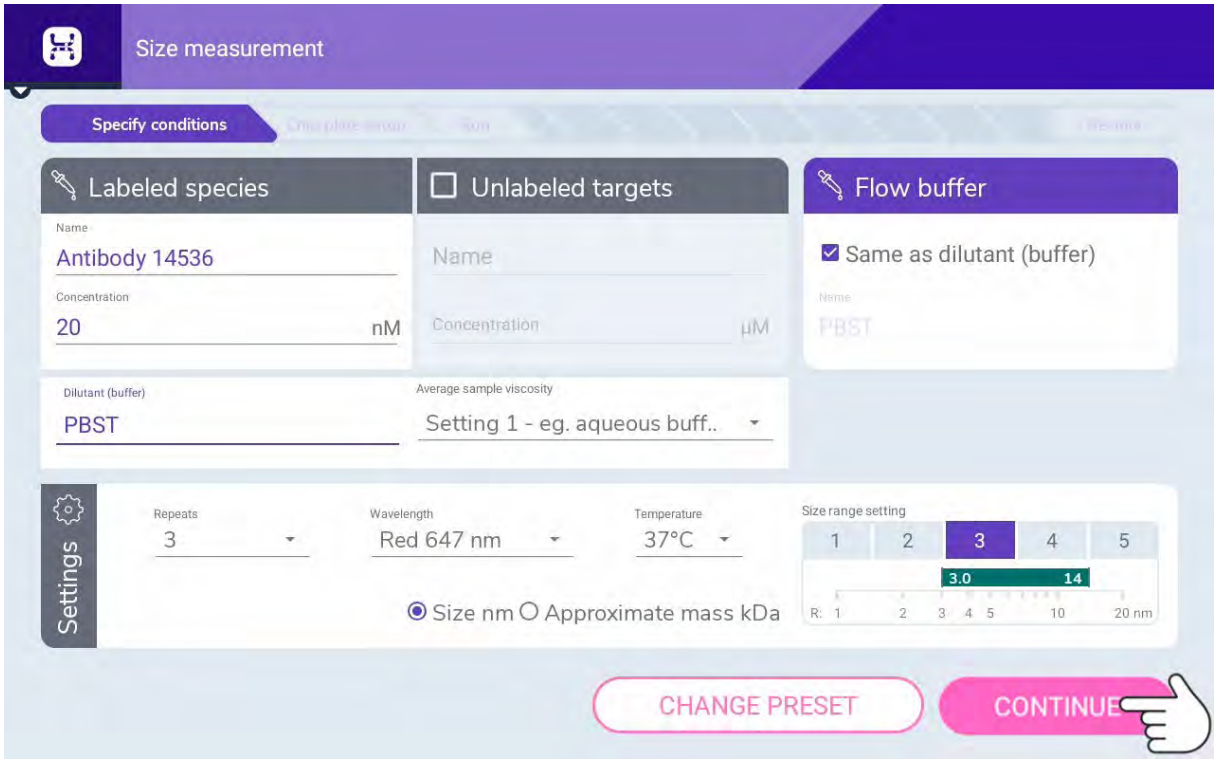
10. Under *Temperature* > select assay temperature. Two options are available: 37°C or 25°C.



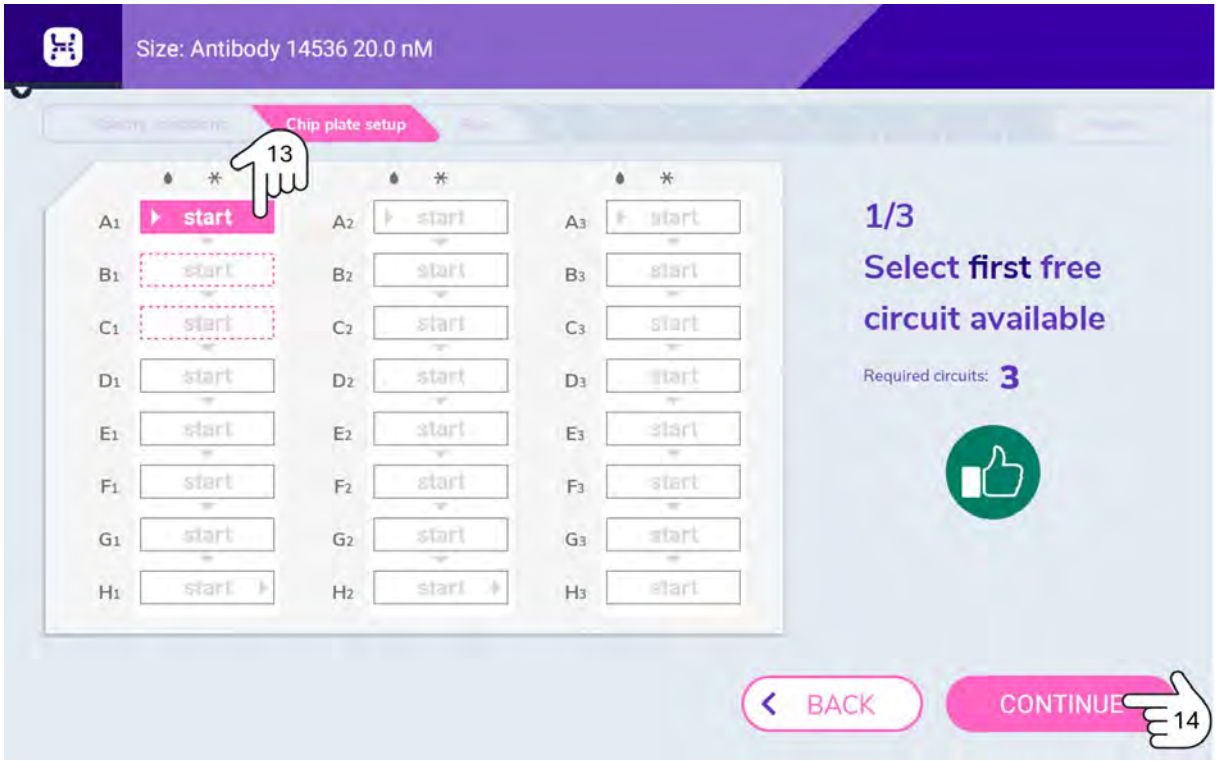
11. Under *Size range setting* > select a size range; see table for size range selection:

Setting:	Minimum Size:	Maximum Size:	Approximate molecular weight for a globular protein:
1	1.0 nm	4.7 nm	1.5 to 150 kDa
2	2.0 nm	9.3 nm	15 to 1,200 kDa
3	3.0 nm	14 nm	45 to 4,500 kDa
4	3.7 nm	17 nm	100 to 8,500 kDa
5	4.3 nm	20 nm	120 to 14,000 kDa

NOTE: Most proteins fall into size setting 3, so this is a good starting point unless you know otherwise. If errors occur, try a larger or smaller size setting. The size range of 3.0 to 14 nm is suitable for measuring globular proteins of a molecular weight between 45 to 4,500 kDa.

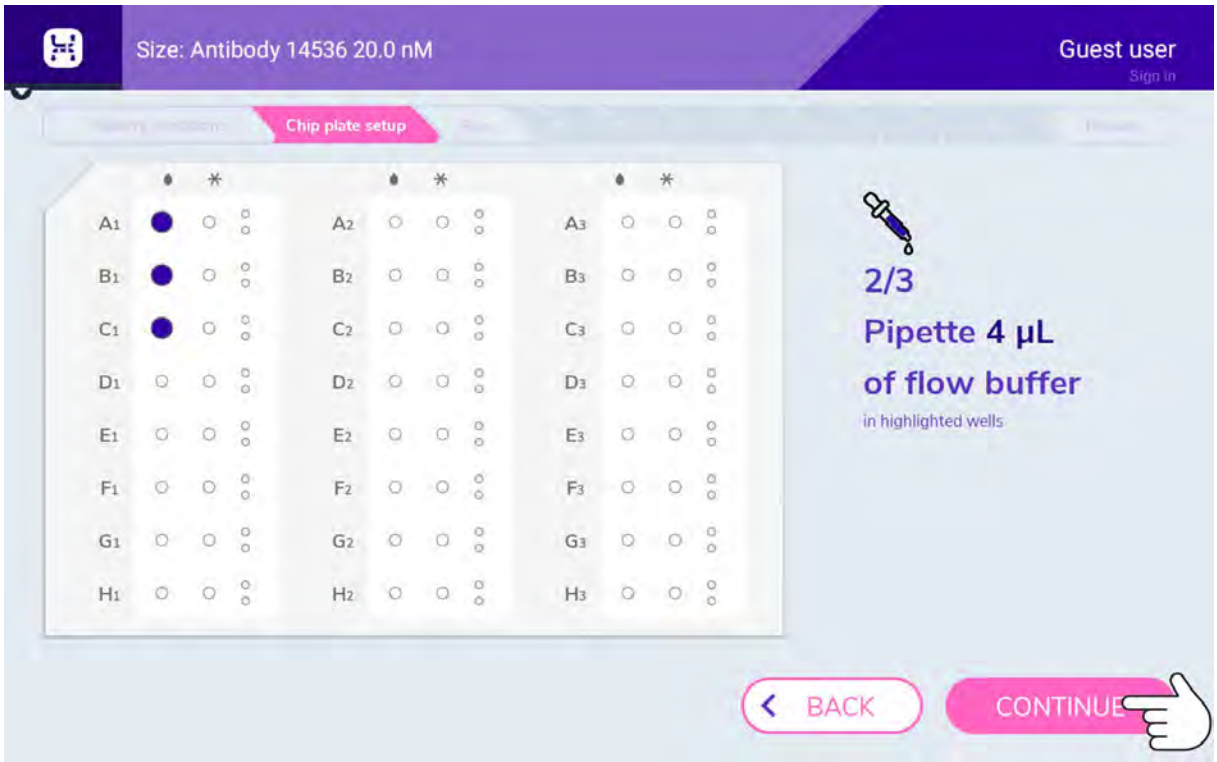


12. Select *CONTINUE*

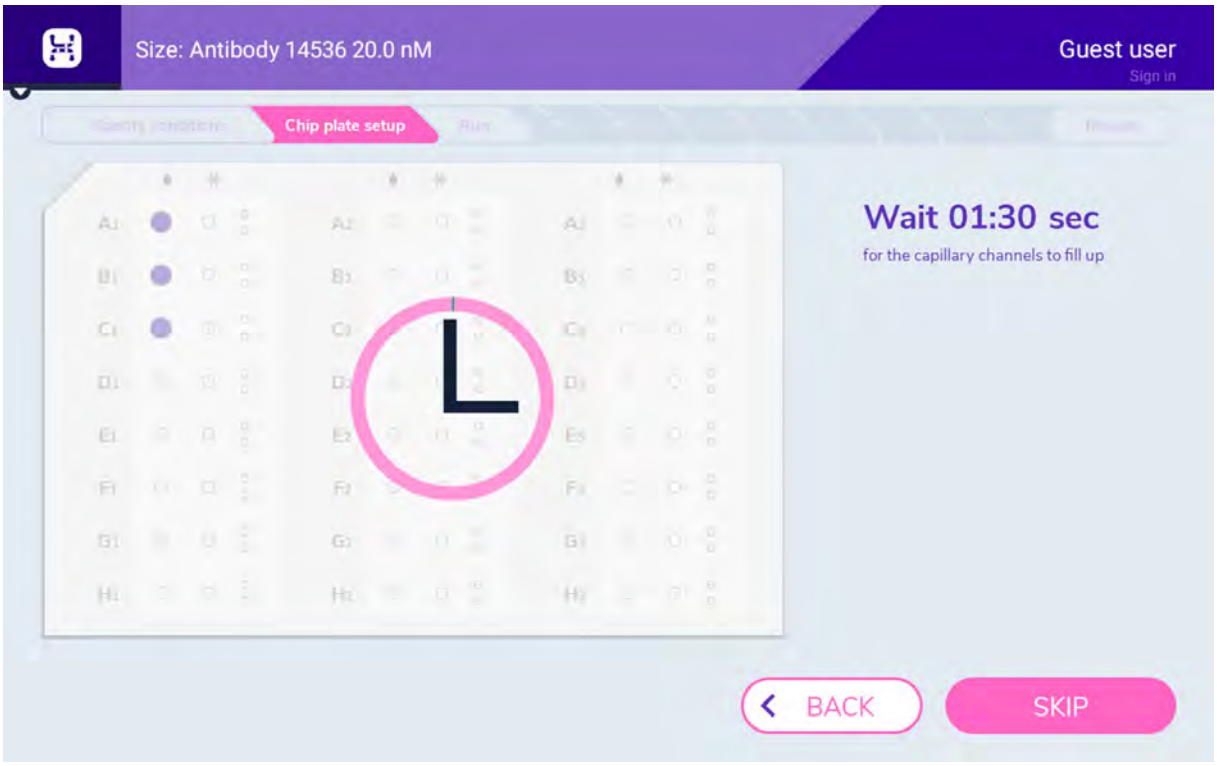


Chip-plate set up screen appears.

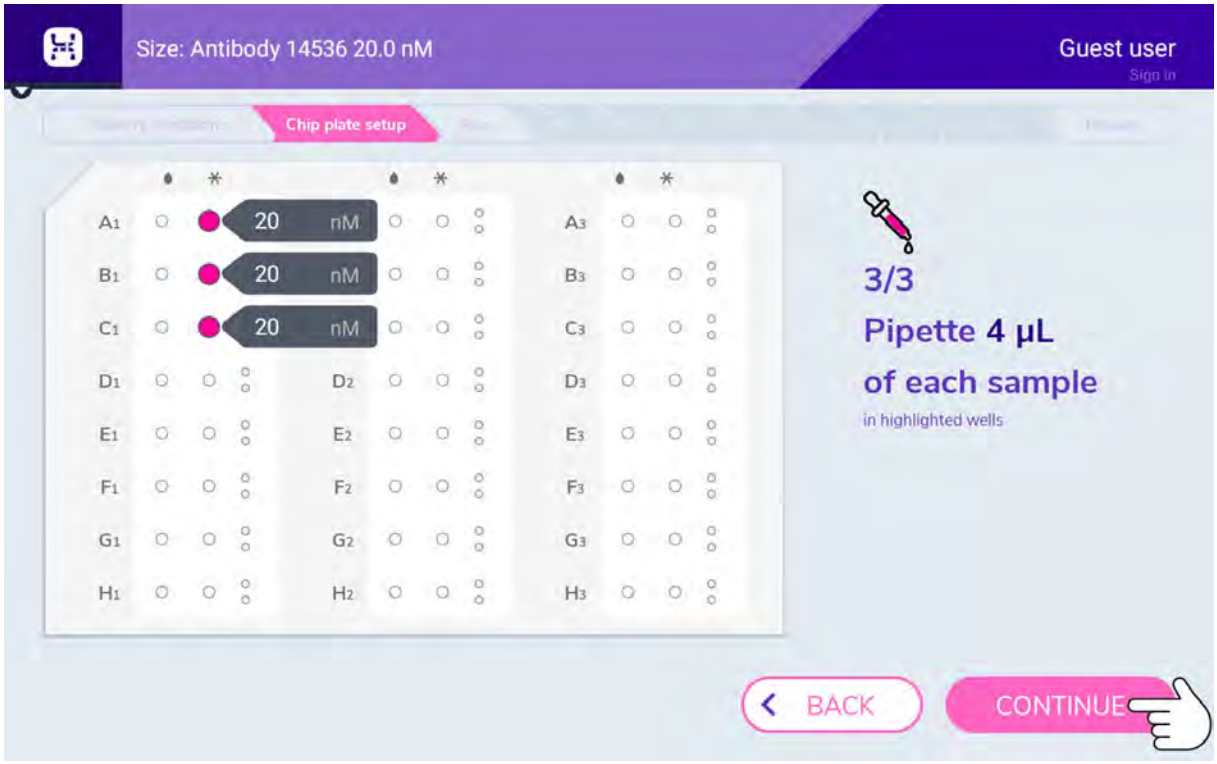
13. Hold the chip-plate near the NFC reader to detect which wells are available, and to check the expiration date (see page 25)
14. Select the first free circuit available
15. Select *CONTINUE*



16. Pipette 4 µL of flow buffer into the highlighted wells and select CONTINUE



17. Wait for the microfluidic circuits to prime

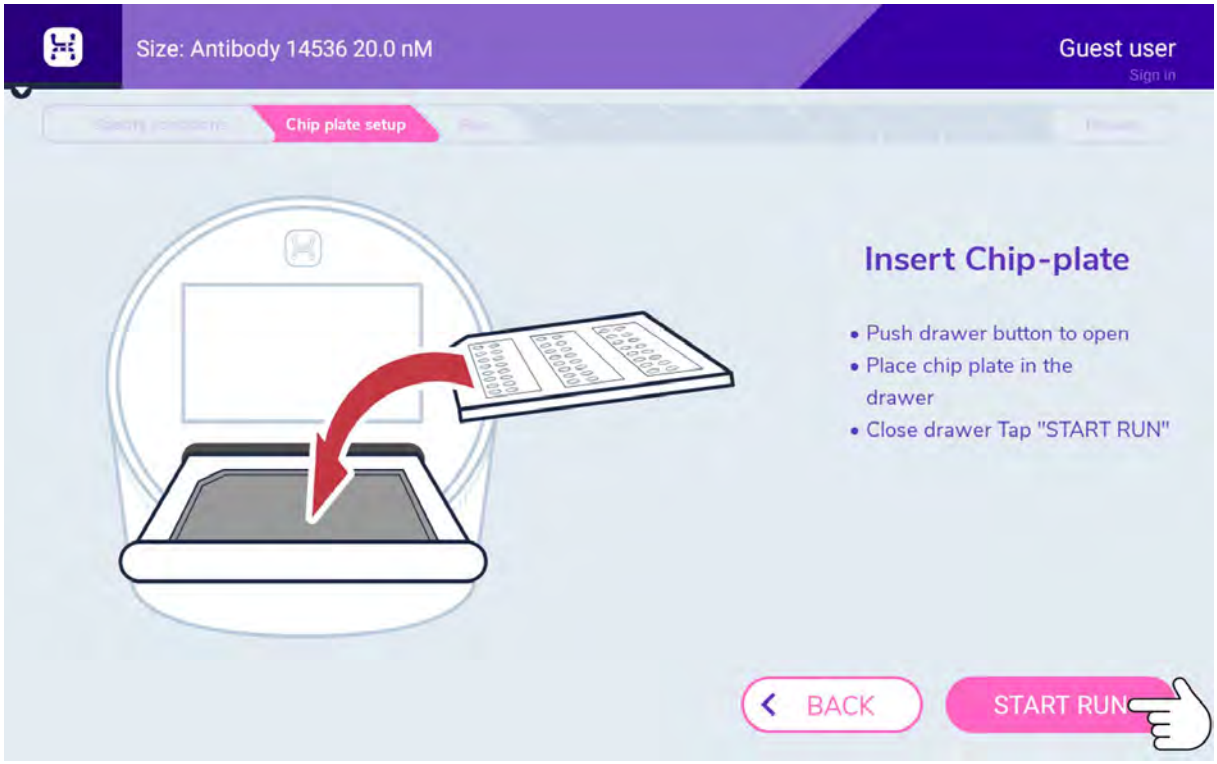


18. Pipette 4 µL of each sample into the highlighted wells and select CONTINUE

19. Insert chip-plate into drawer:

    a. Push drawer button to open

NOTE: The button is located on the front of the instrument, to the right of the drawer.



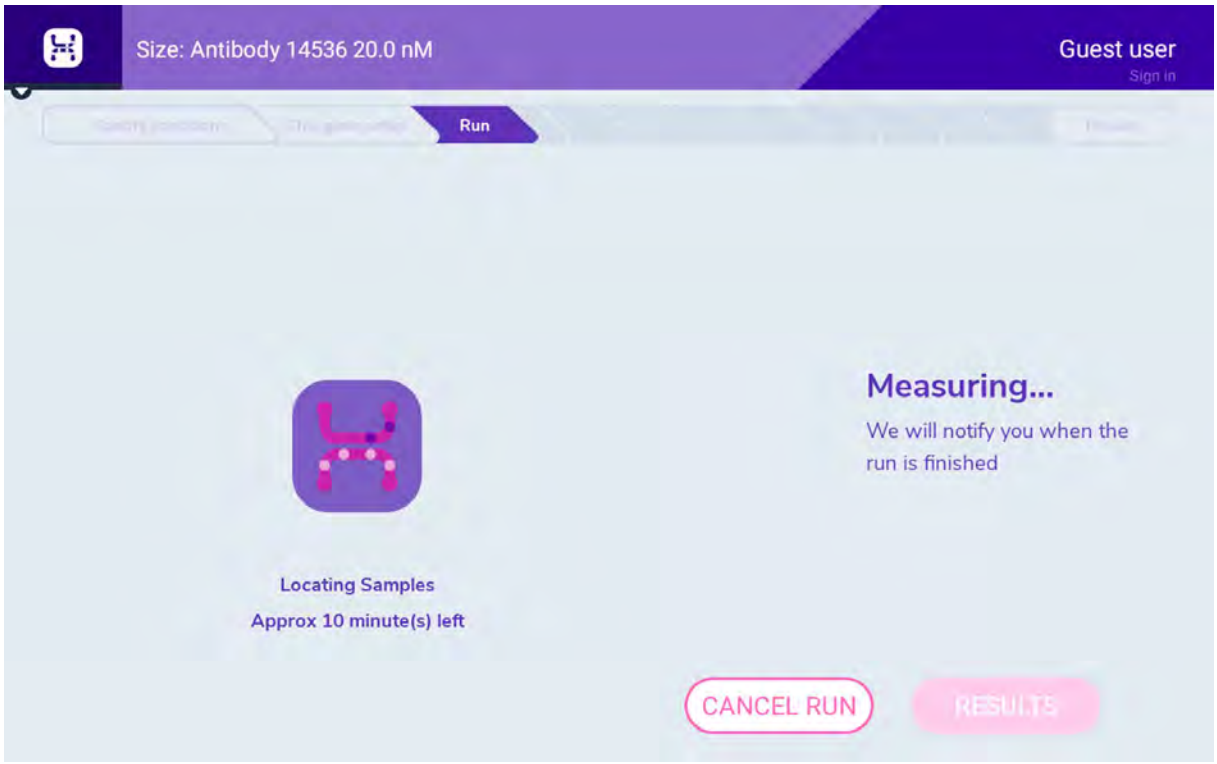
    b. Insert chip-plate in the drawer

    c. Make sure that the chip-plate is fully seated

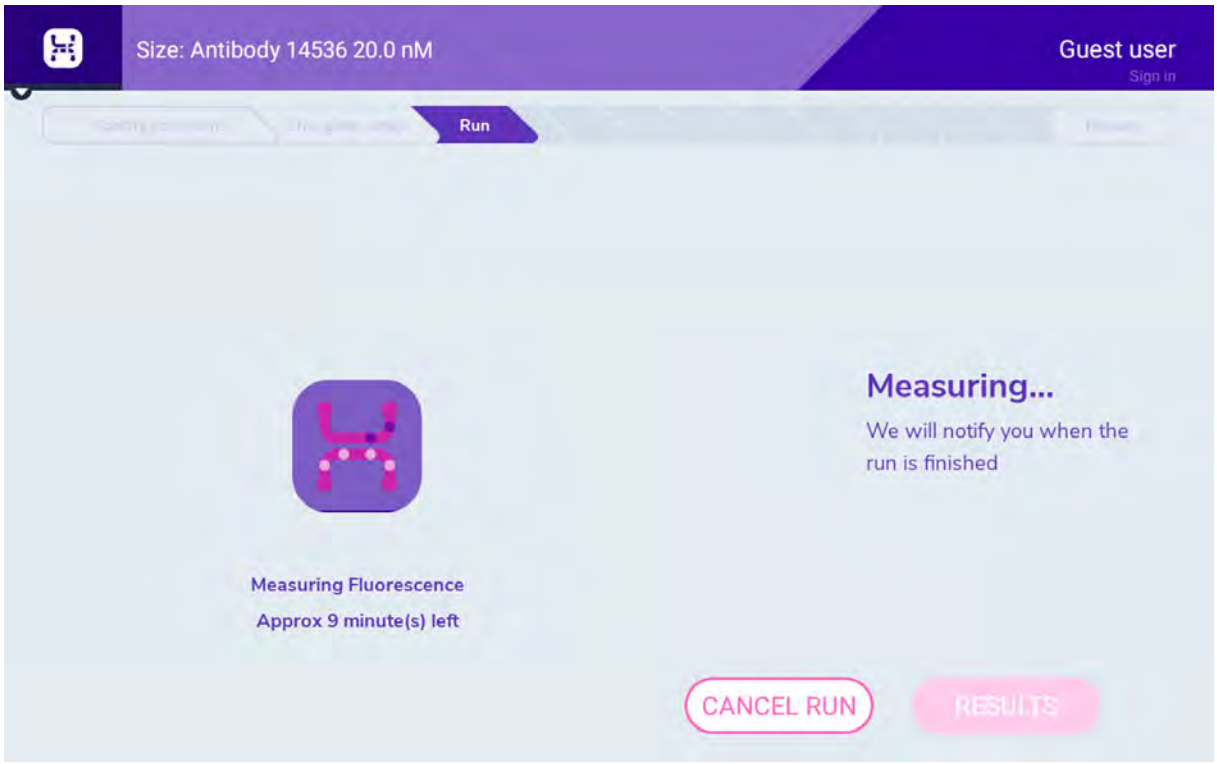
    d. Push drawer button to close

    e. Select *START RUN*

NOTE: Use of an expired chip-plate results in a notification pop up message; proceed in accordance with local protocols.



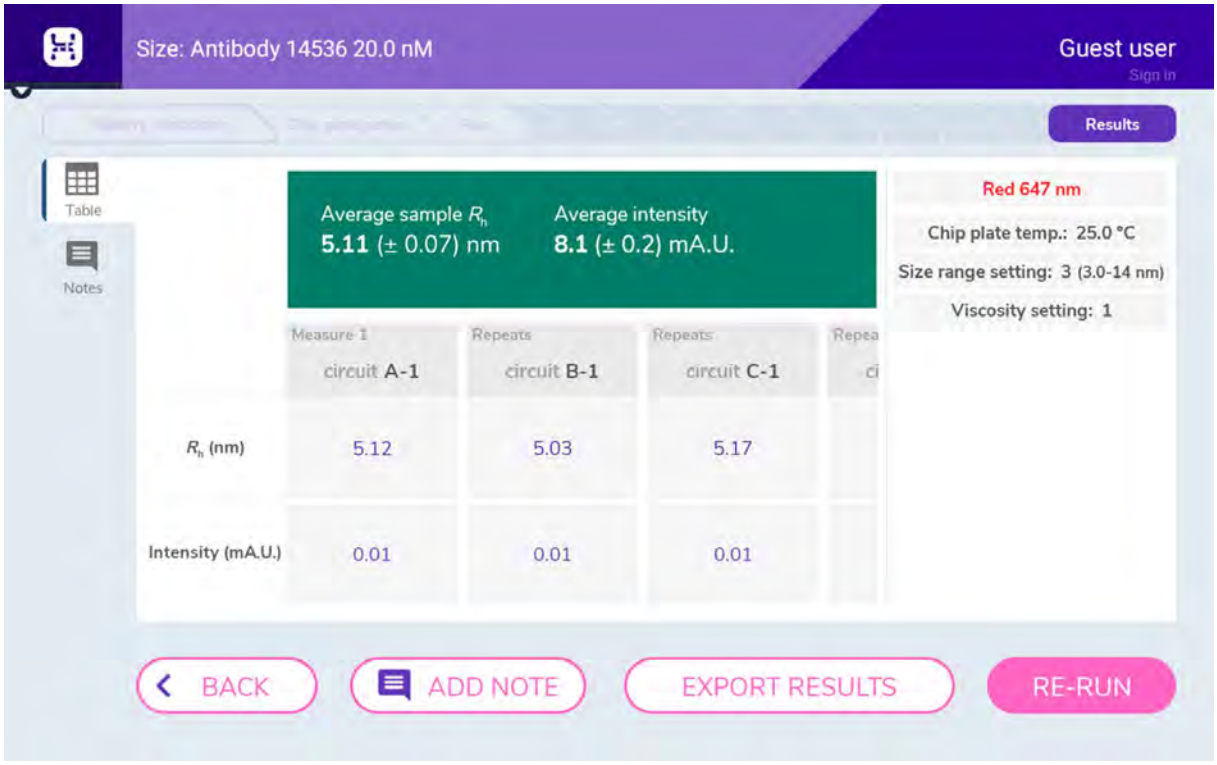
i. The instrument begins by locating the samples in the chip-plate



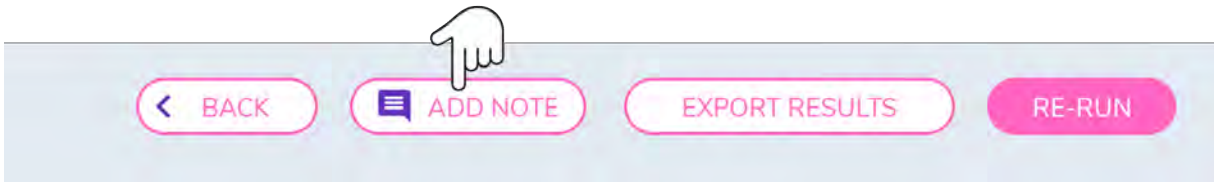
ii. Next the instrument measures the fluorescence after the run

20. Wait for measurement to complete

    When measurement is complete, results will be displayed automatically.



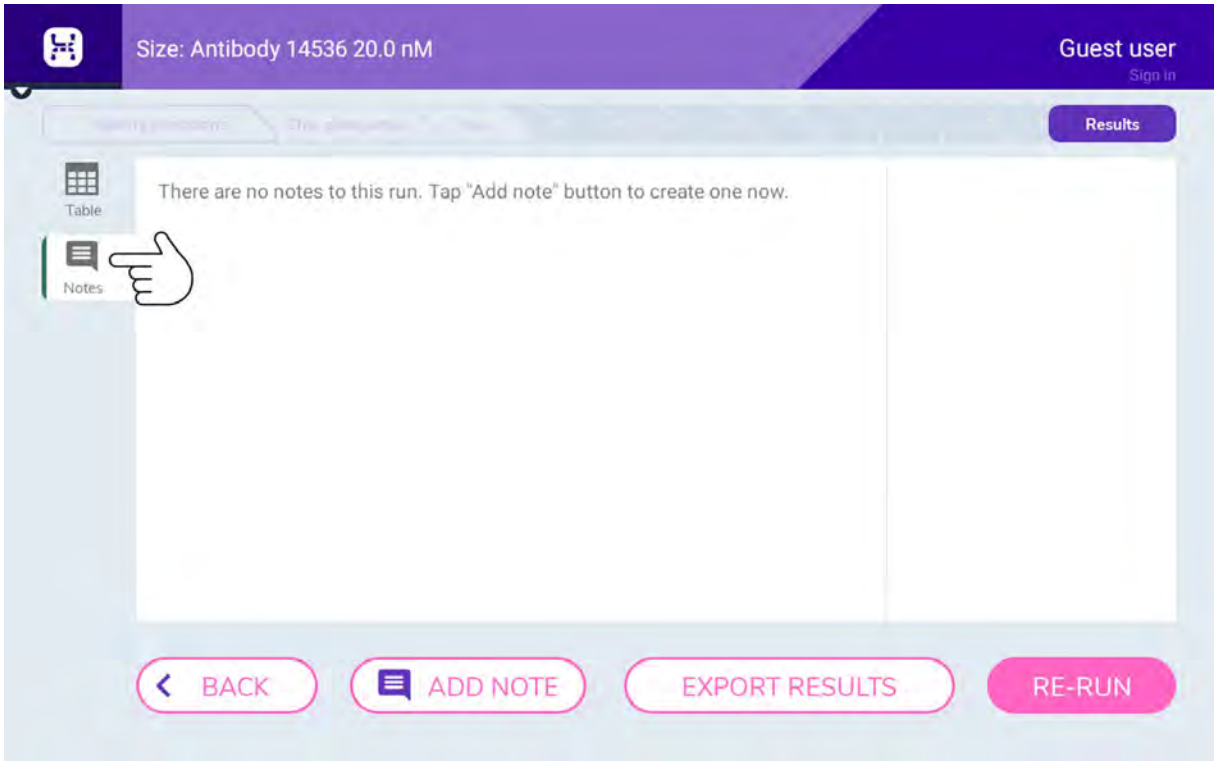
    The results screen appears.



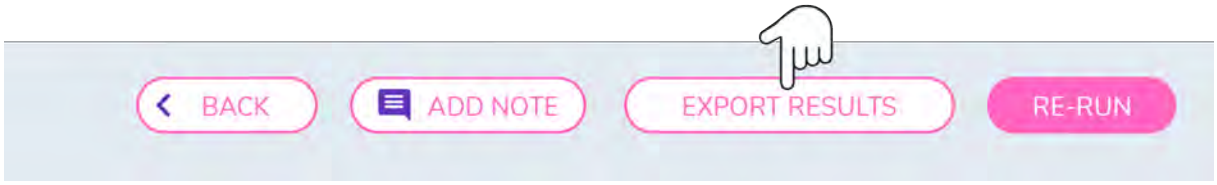
21. If required, select *ADD NOTE* to add a note to the run



22. Under *Add a note* > enter your note for the run, then select *ADD* to save the note

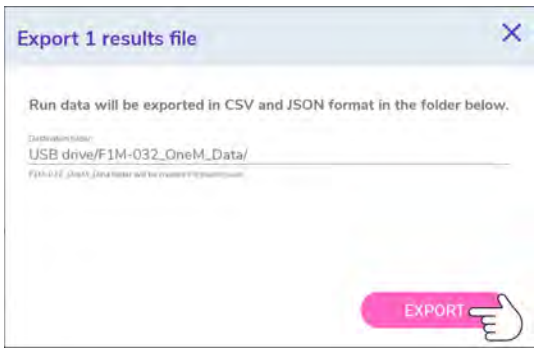


23. Select *Notes* icon to view notes included with the run
24. Connect a flash drive to the USB port

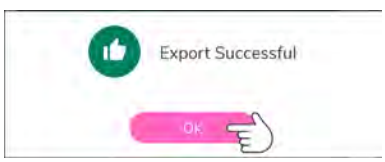


25. Select *EXPORT RESULTS*
26. Navigate to destination folder

    NOTE: A folder with the instrument name will be created automatically on the flash drive if it doesn't exist.



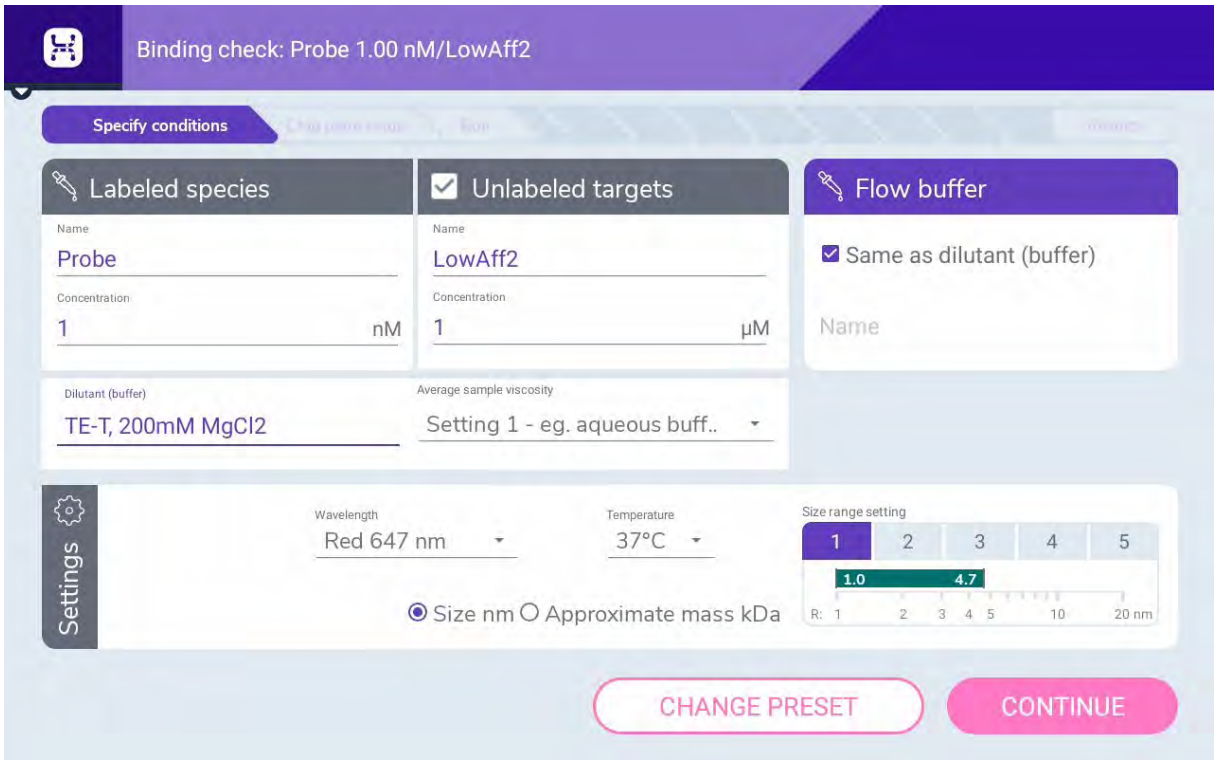
27. Select *EXPORT*



    When file export is complete, the *Export Successful* screen appears.

28. Select *OK* to exit

Set up *Binding check* run



1. Enter experiment conditions in the following fields:
   NOTE: For more detailed information about the steps please see Set up *Size measurement run*
   a. Under *Labeled species* > enter a *Name* and a *Concentration*.
   b. Under *Unlabeled targets* > enter a *Name* > enter a *Concentration*.
   c. Select the check box *Same as dilutant (buffer)* > add a name (optional).
   d. Under *Dilutant (buffer)* > enter the type of dilutant buffer.
   e. Under *Average sample viscosity* > select a viscosity setting from the dropdown menu; see table for viscosity range selection:

Setting:	Minimum Viscosity:	Maximum Viscosity:	Glycerol (v/v):	Potential sample / flow buffer type:
1	0.82 cP	1.08 cP	0 to 6%	Water, and standard buffer
2	0.95 cP	1.22 cP	2 to 9.5%	Glycerol
3	1.23 cP	1.62 cP	9.5 to 18%	Pure serum, and plasma
4	1.34 cP	1.73 cP	13 to 20%	Higher viscosity serum, and plasma

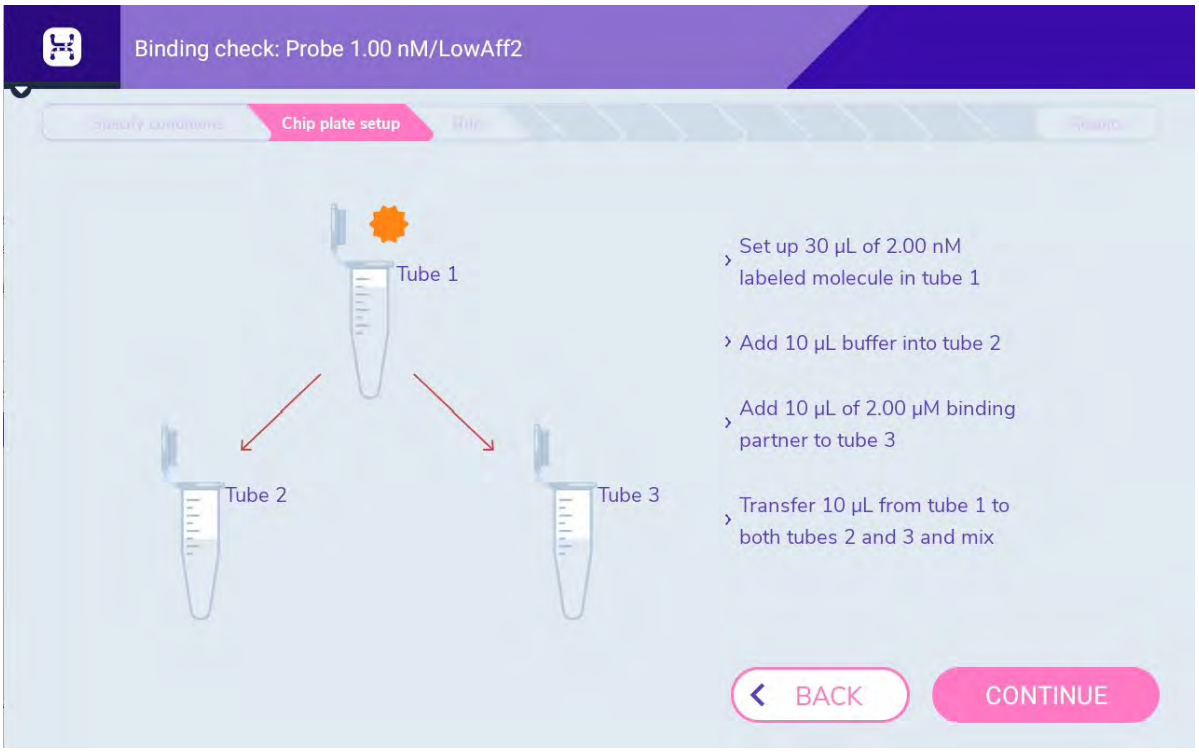
   f. In *Settings* field > select a *Wavelength*. **NOTE:** Select a wavelength compatible with your fluorophore dye.
   g. Under *Temperature* > select assay temperature.
   h. Under *Size range* setting > select a size range; see table for size range selection:

Setting:	Minimum Size:	Maximum Size:	Approximate molecular weight for a globular protein:
1	1.0 nm	4.7 nm	1.5 to 150 kDa
2	2.0 nm	9.3 nm	15 to 1,200 kDa
3	3.0 nm	14 nm	45 to 4,500 kDa

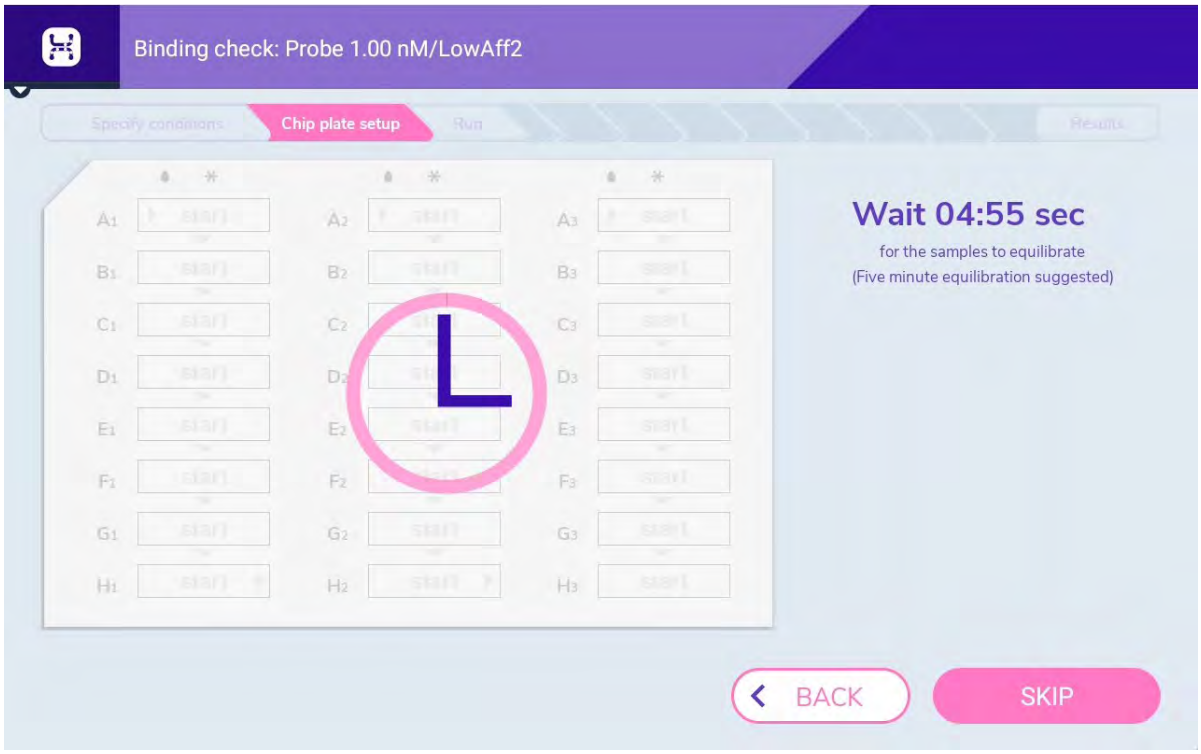
4	3.7 nm	17 nm	100 to 8,500 kDa
5	4.3 nm	20 nm	120 to 14,000 kDa

NOTE: Most proteins fall into size setting 3, so this is a good starting point unless you know otherwise. If errors occur, try a larger or smaller size setting. The size range of 3.0 to 14 nm is suitable for measuring globular proteins of a molecular weight between 45 to 4,500 kDa.

2. Select *CONTINUE*
3. Prepare Samples according to the setup.

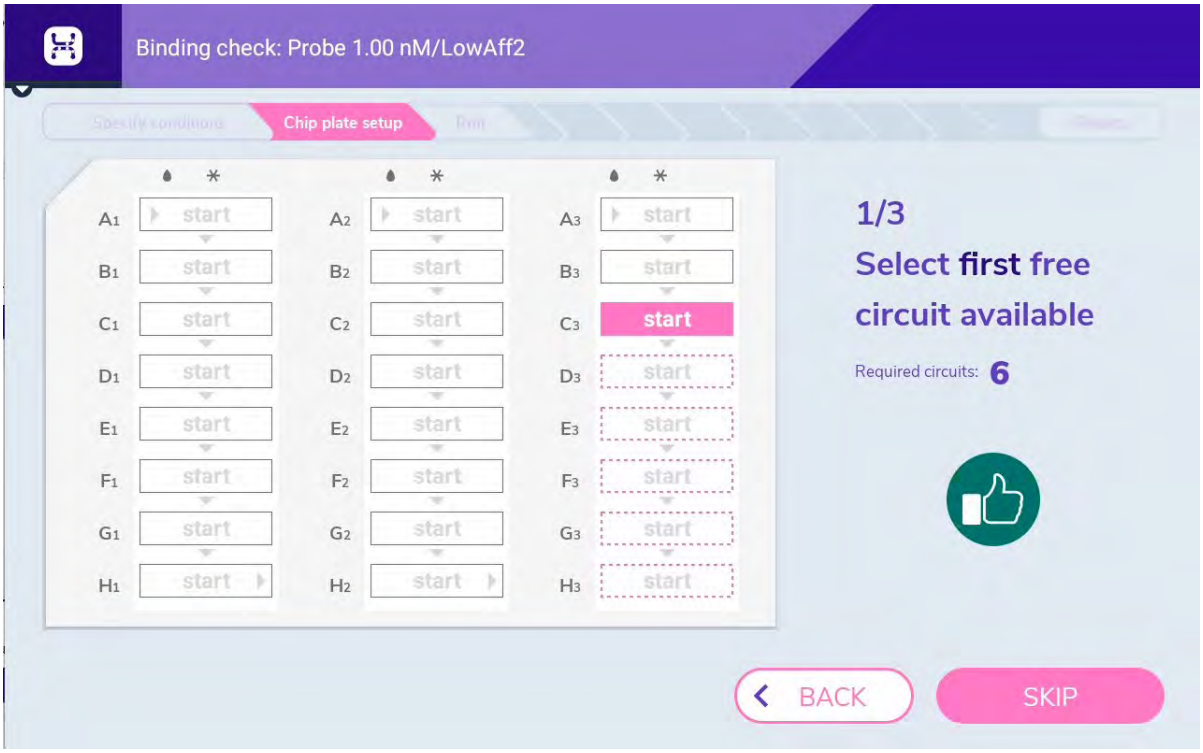


4. Click *Continue*. Incubate Samples for 5 min, suggested time.

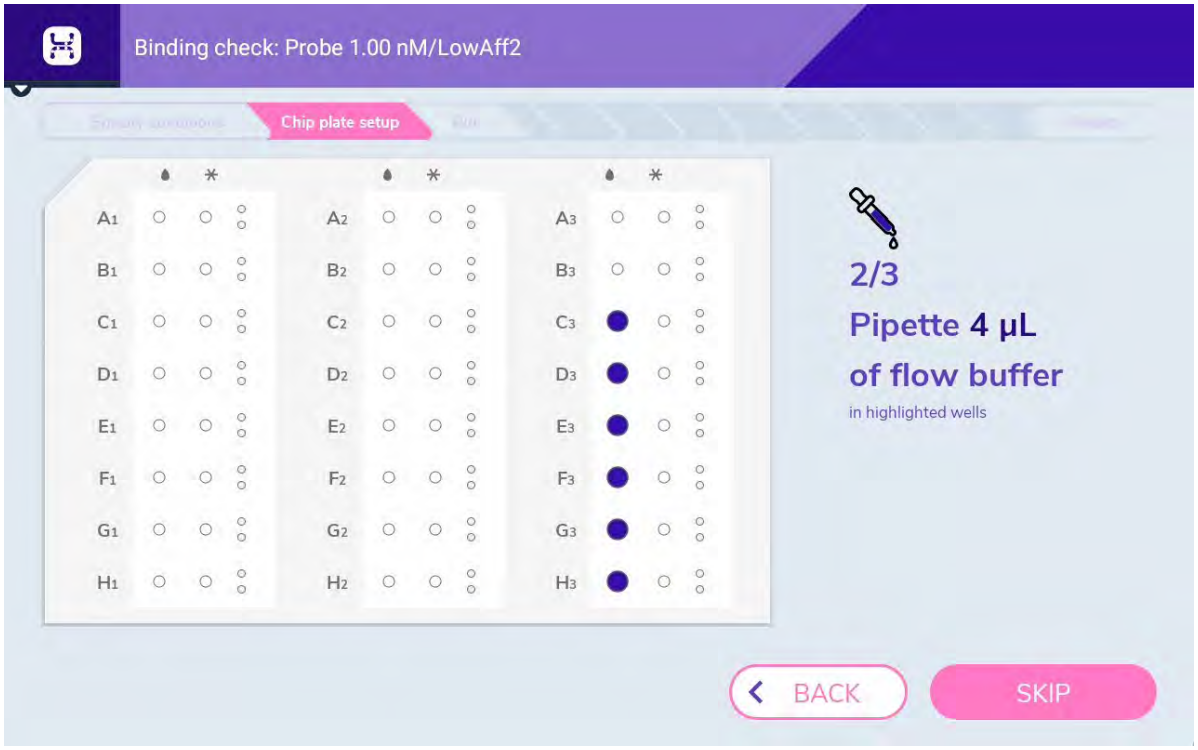


5. Hold the chip-plate near the NFC reader to detect which wells are available, and to check the expiration date (see page 25).

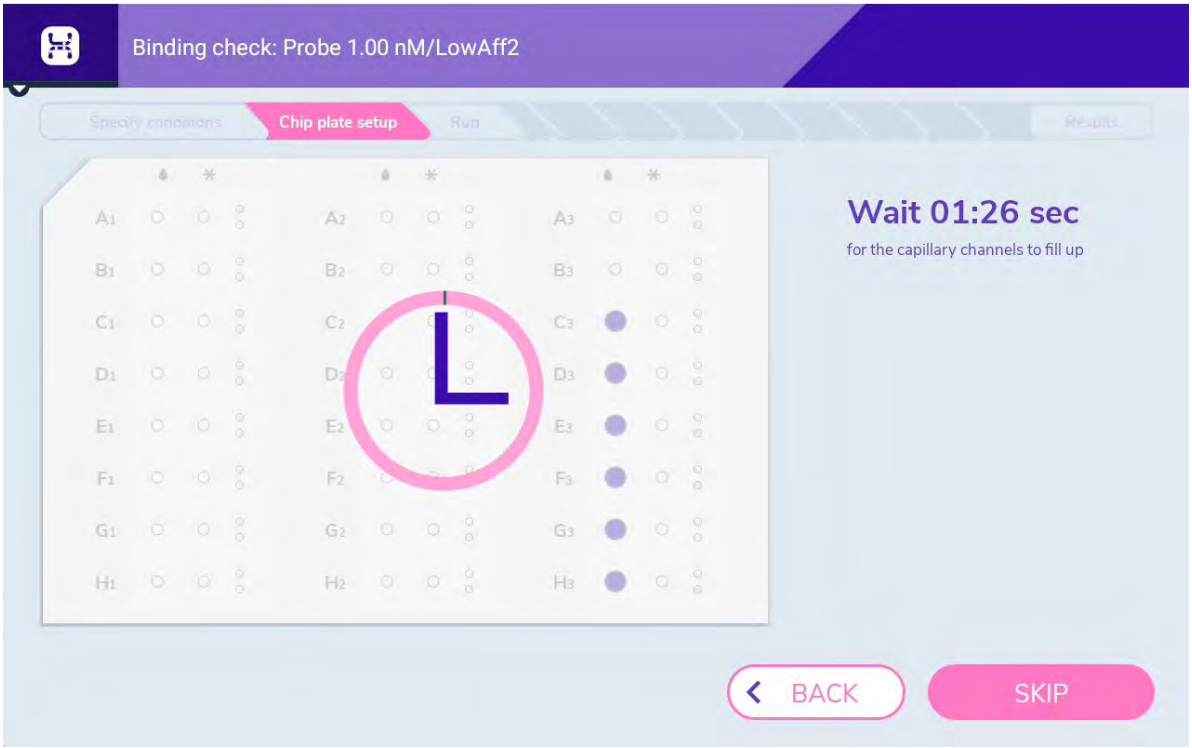
6. Select the first free circuit on the chip-plate.



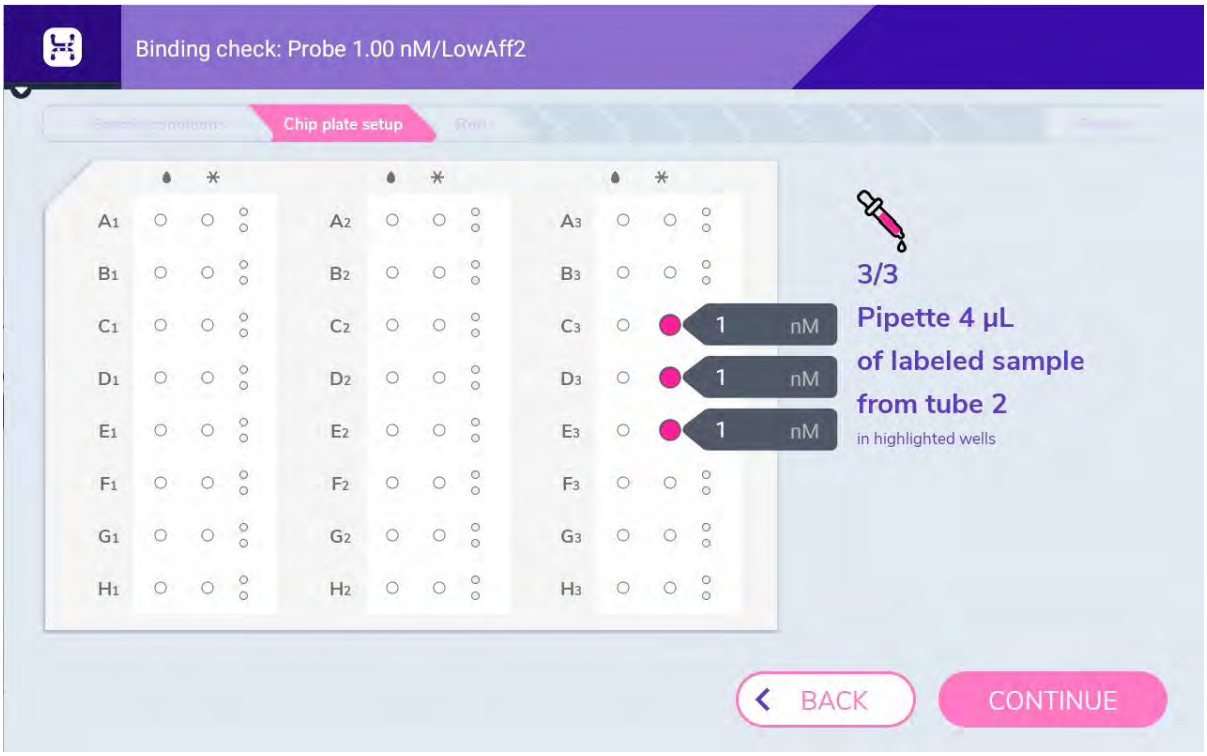
7. Load 4 µL of buffer in the Aux ports.



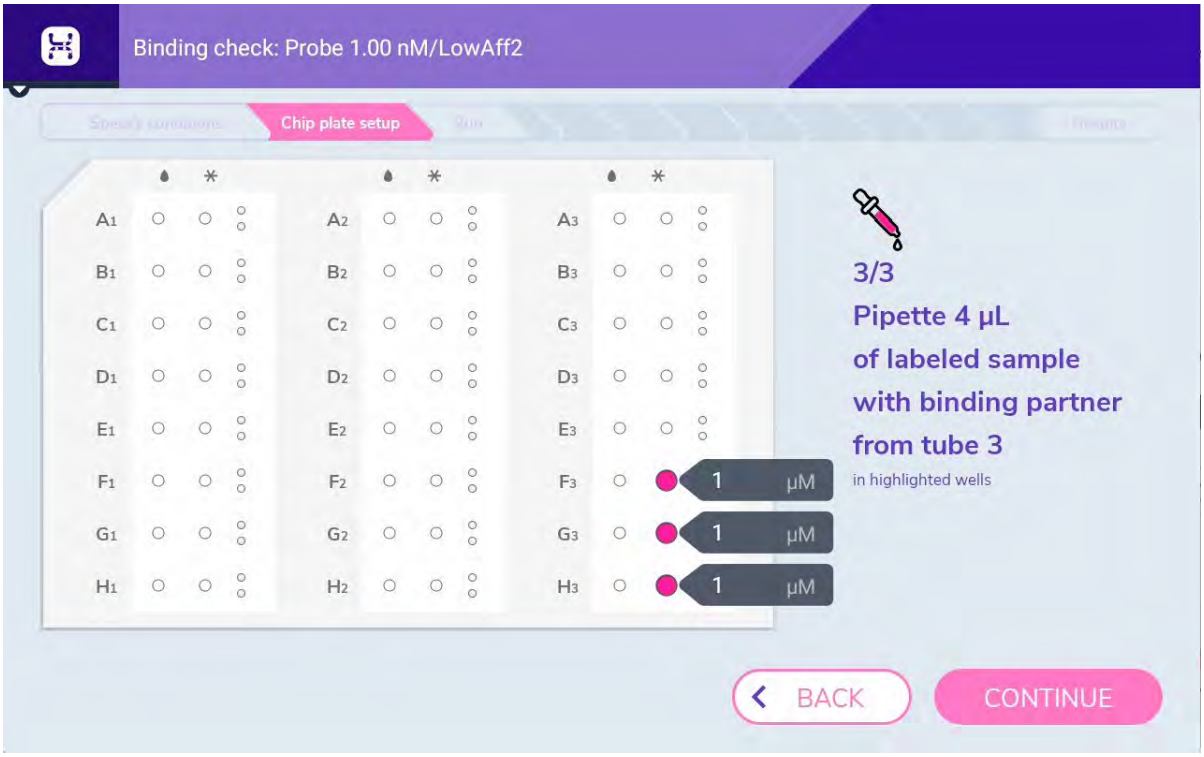
8. Wait 90 seconds for priming.



9. Load 4 µL of Tube 2 in the following Sample ports.

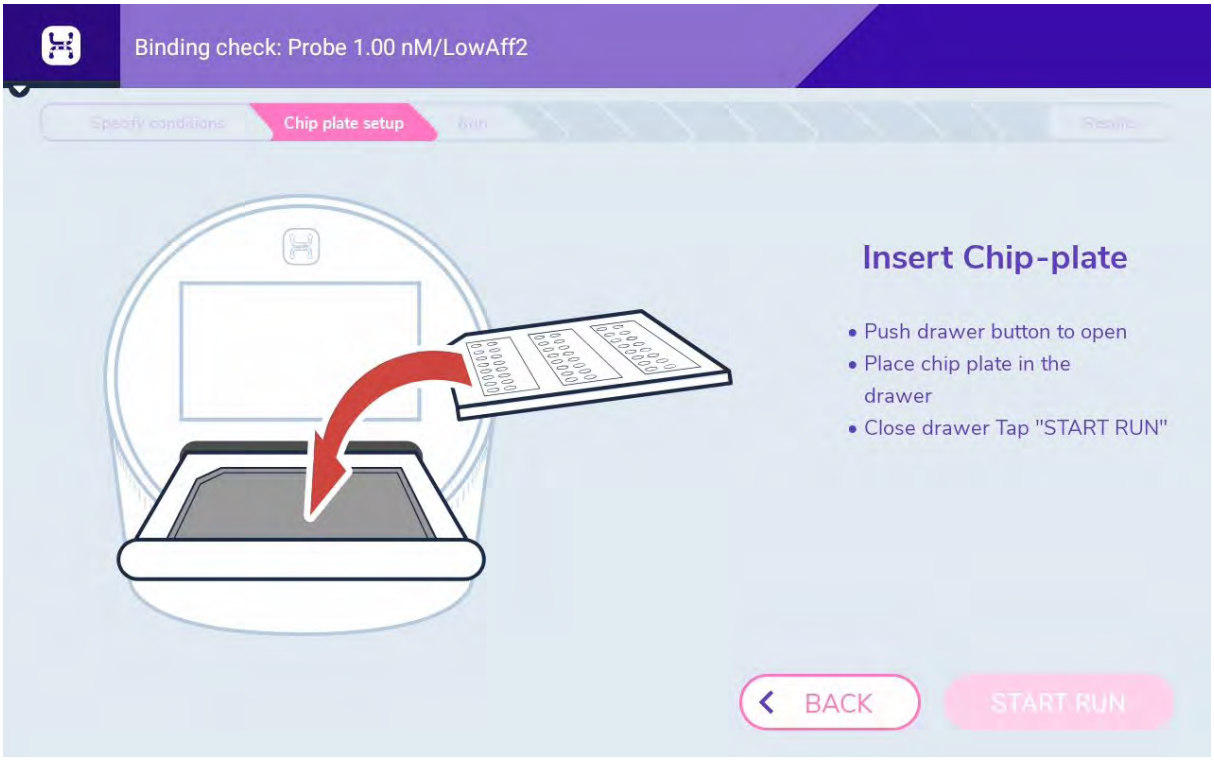


10. Load 4 µL of Tube 3 in the following Sample ports.



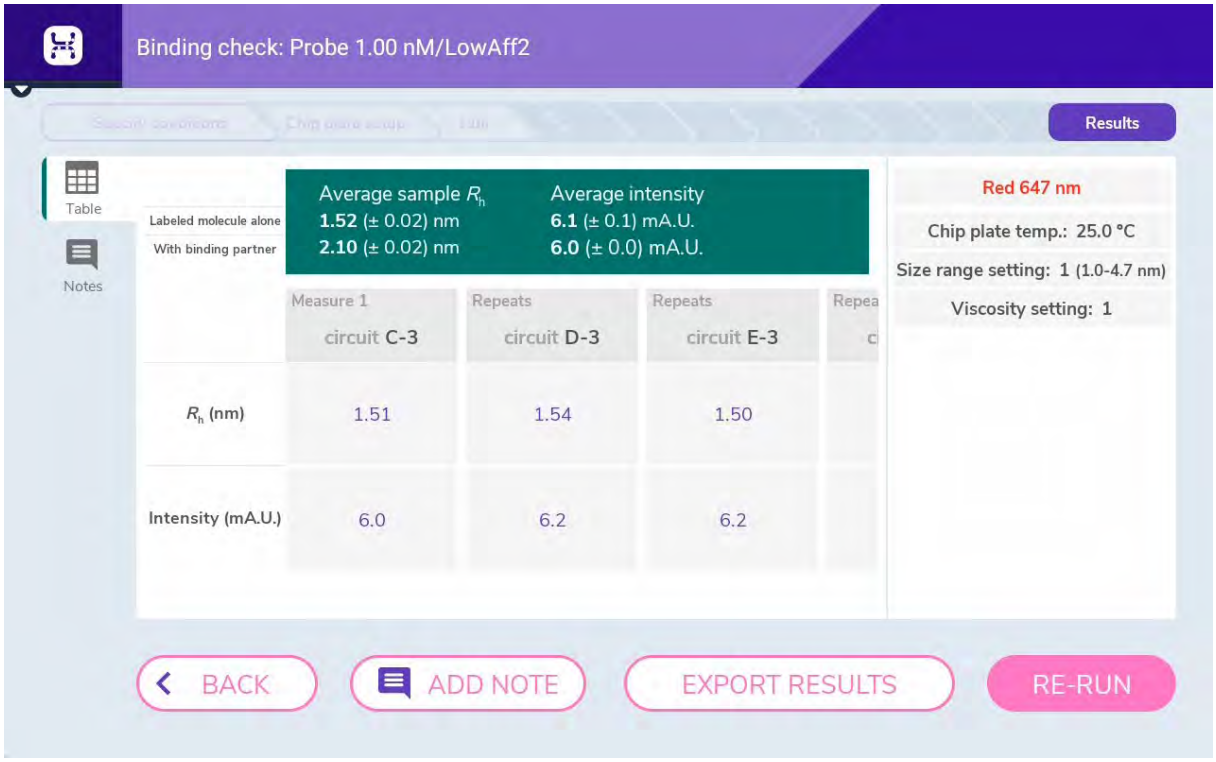
11. Insert Chip-plate into instrument:
    a. Push drawer button to open
    b. Insert chip-plate in the drawer
    c. Make sure that the chip-plate is fully seated
    d. Push drawer button to close
    e. Select *START RUN*

NOTE: Use of an expired chip-plate results in a notification pop up message; proceed in accordance with local protocols.



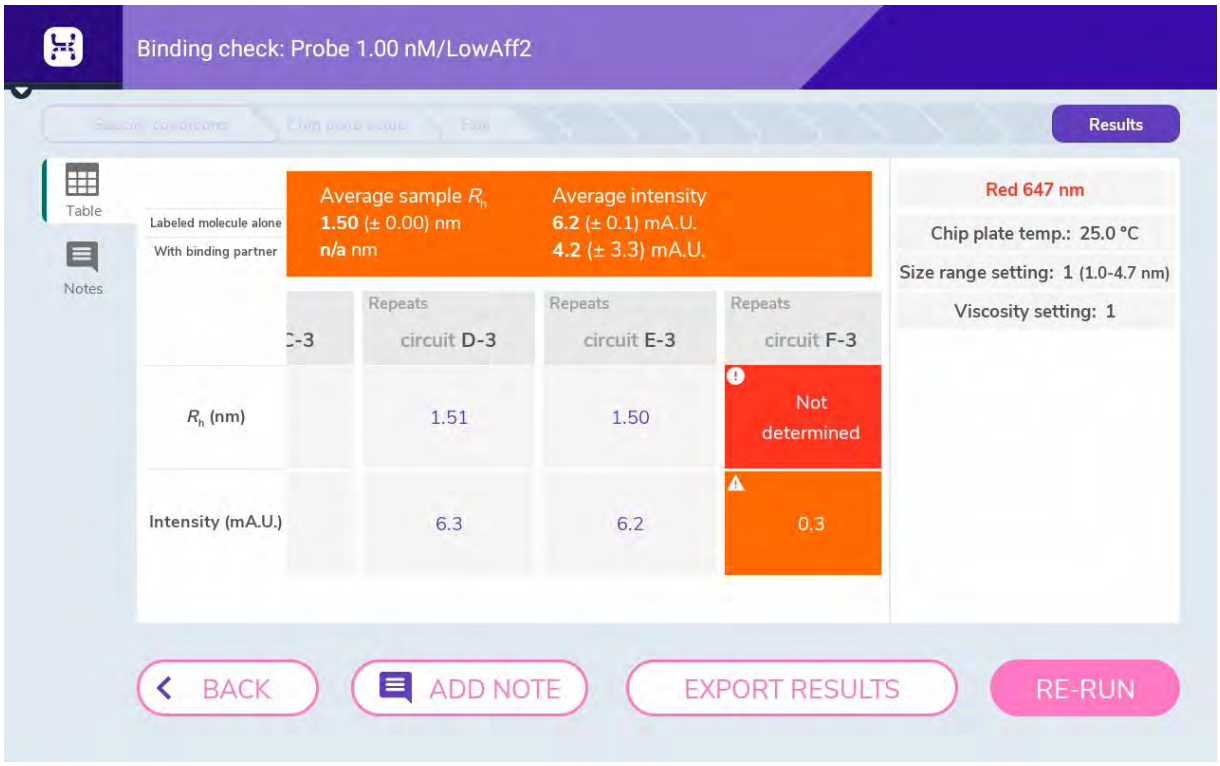
12. Wait for measurement to complete

When measurement is complete, results will be displayed automatically.

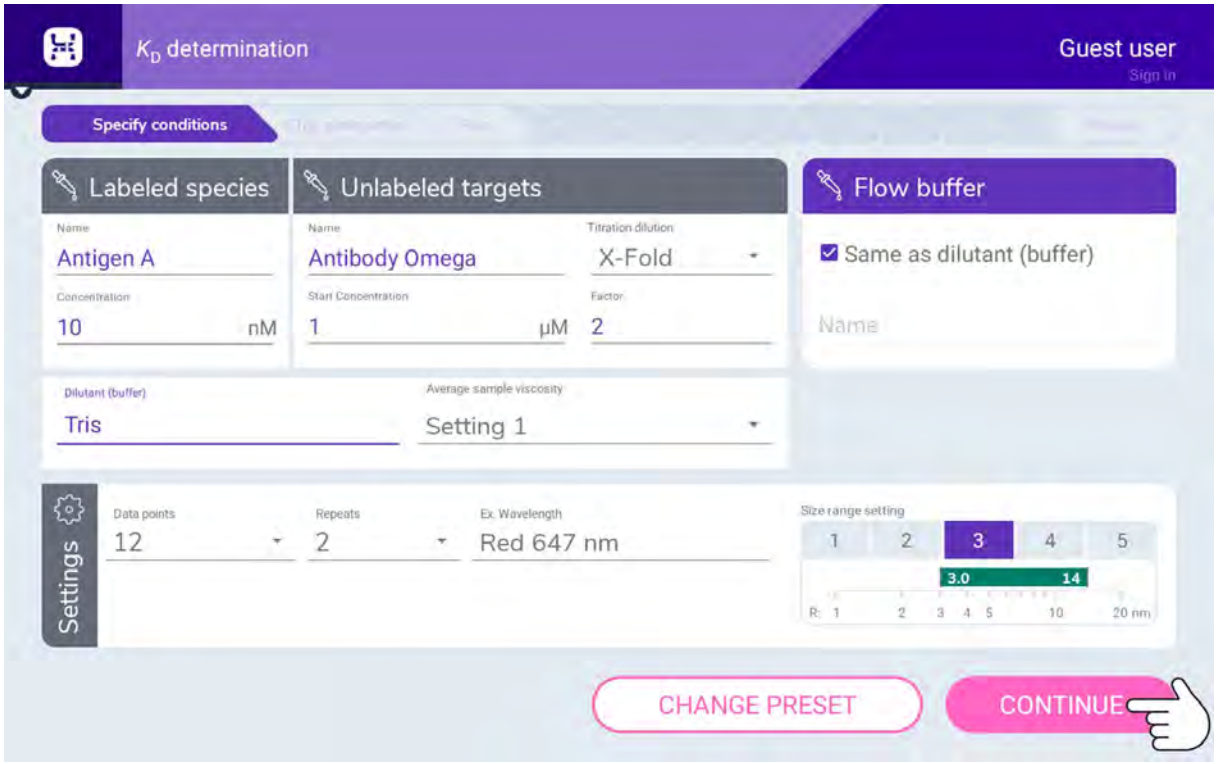


In this result, the average size of the labeled species and the complex are displayed in a table. The table is highlighted in either green or orange, suggesting that:

- Green: binding occurs and all 6 data points report valid sizes. Binding is confirmed when the measured $Rh_{complex}$ is greater than the Rh_{free}, and when the respective sizes do not overlap when considering the standard deviation.
- Orange: either (i) no binding or (ii) that one or more circuits have failed, requiring the user to review the results.



Set up *K_D determination* run



1. Enter experiment conditions in the following fields:

   NOTE: For more detailed information about the steps please see Set up *Size measurement* run.

   a. Under Labeled species > enter a Name and a Concentration.

   b. Under Unlabeled targets > enter a Name > enter Start concentration > select a Titration dilution from the dropdown menu > and enter a dilution Factor value.

   c. NOTE: Titration concentrations will be automatically calculated.

   d. Select the check box *Same as dilutant (buffer)* > add a name (optional).

   e. Under *Dilutant (buffer)* > enter the type of dilutant buffer.

   f. Under *Average sample viscosity* > select a viscosity setting from the dropdown menu; see table for viscosity range selection:

Setting:	Minimum Viscosity:	Maximum Viscosity:	Glycerol (v/v):	Potential sample / flow buffer type:
1	0.82 cP	1.08 cP	0 to 6%	Water, and standard buffer
2	0.95 cP	1.22 cP	2 to 9.5%	Glycerol
3	1.23 cP	1.62 cP	9.5 to 18%	Pure serum, and plasma
4	1.34 cP	1.73 cP	13 to 20%	Higher viscosity serum, and plasma

   NOTE: Samples should be diluted with a diluent of comparable viscosity to the sample itself. For serum or plasma samples Fluidic Sciences has developed a suitable matching buffer; please contact us for details.

   g. In *Settings* field > select *Data points* (number of dilutions) > select number of *Repeats* > and select an *Excitation Wavelength* from the dropdown menus.

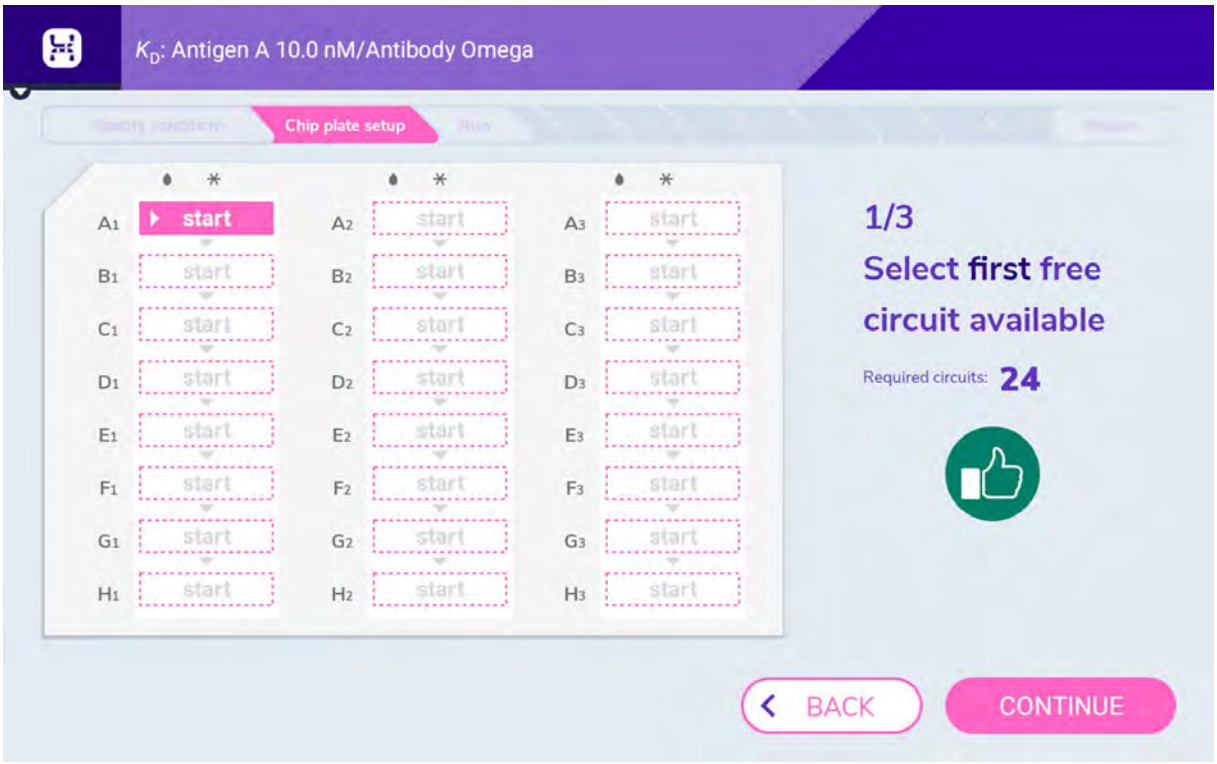
NOTE: Select a wavelength compatible with your fluorophore dye.

h. Under *Size range setting* > select a size range; see table for size range selection:

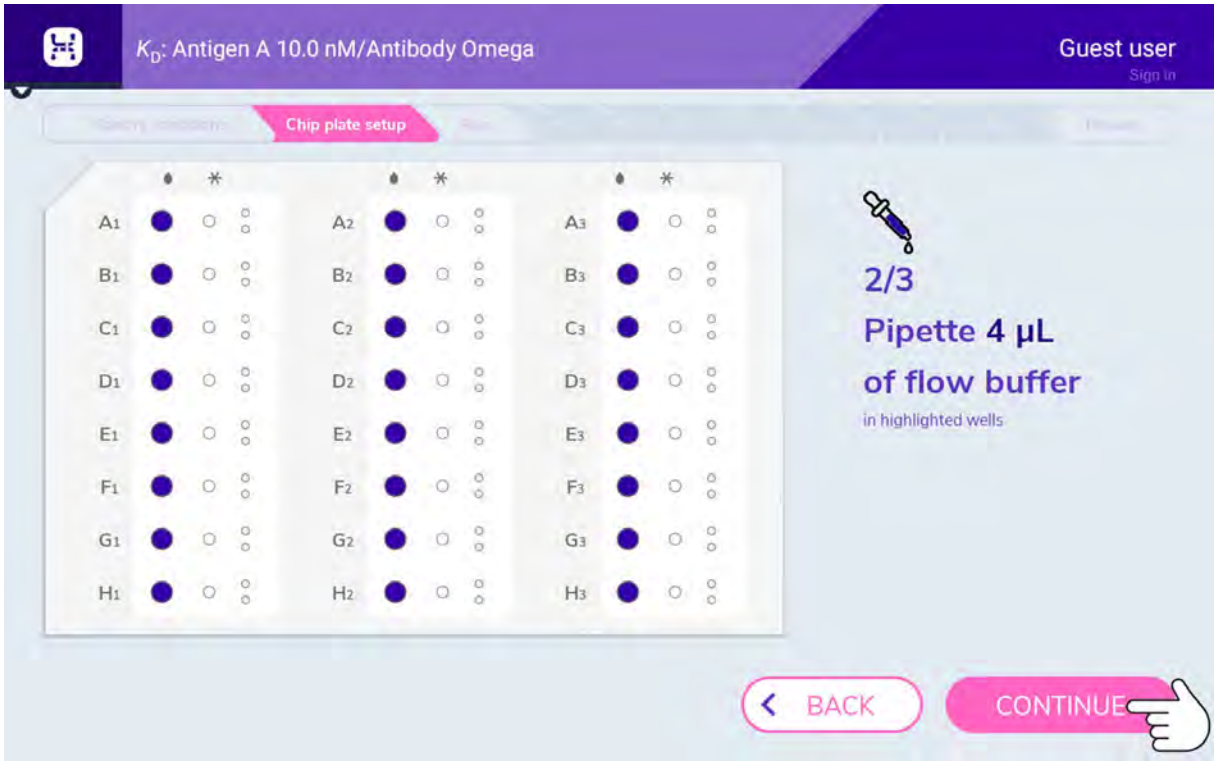
Setting:	Minimum Size:	Maximum Size:	Approximate molecular weight for a globular protein:
1	1.0 nm	4.7 nm	1.5 to 150 kDa
2	2.0 nm	9.3 nm	15 to 1,200 kDa
3	3.0 nm	14 nm	45 to 4,500 kDa
4	3.7 nm	17 nm	100 to 8,500 kDa
5	4.3 nm	20 nm	120 to 14,000 kDa

NOTE: Most proteins fall into size setting 3, so this is a good starting point unless you know otherwise. If errors occur, try a larger or smaller size setting. The size range of 3.0 to 14 nm is suitable for measuring globular proteins of a molecular weight between 45 to 4,500 kDa.

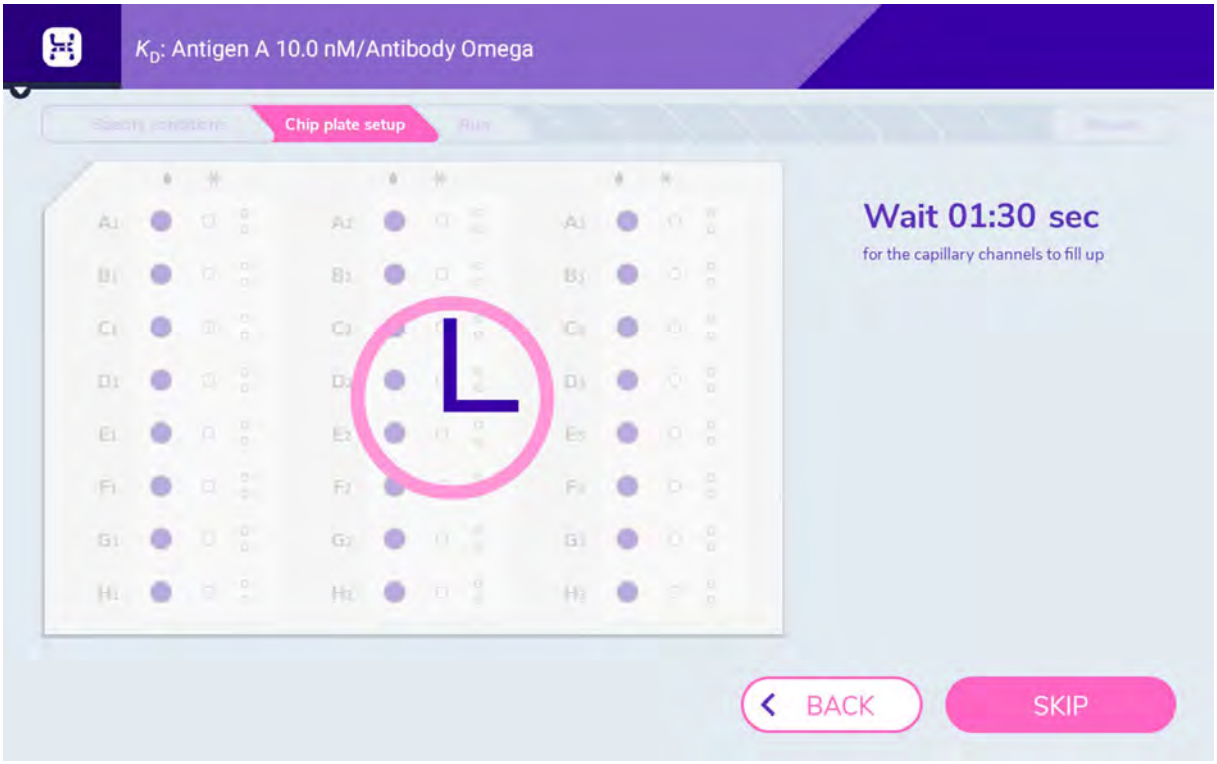
2. Select *CONTINUE*



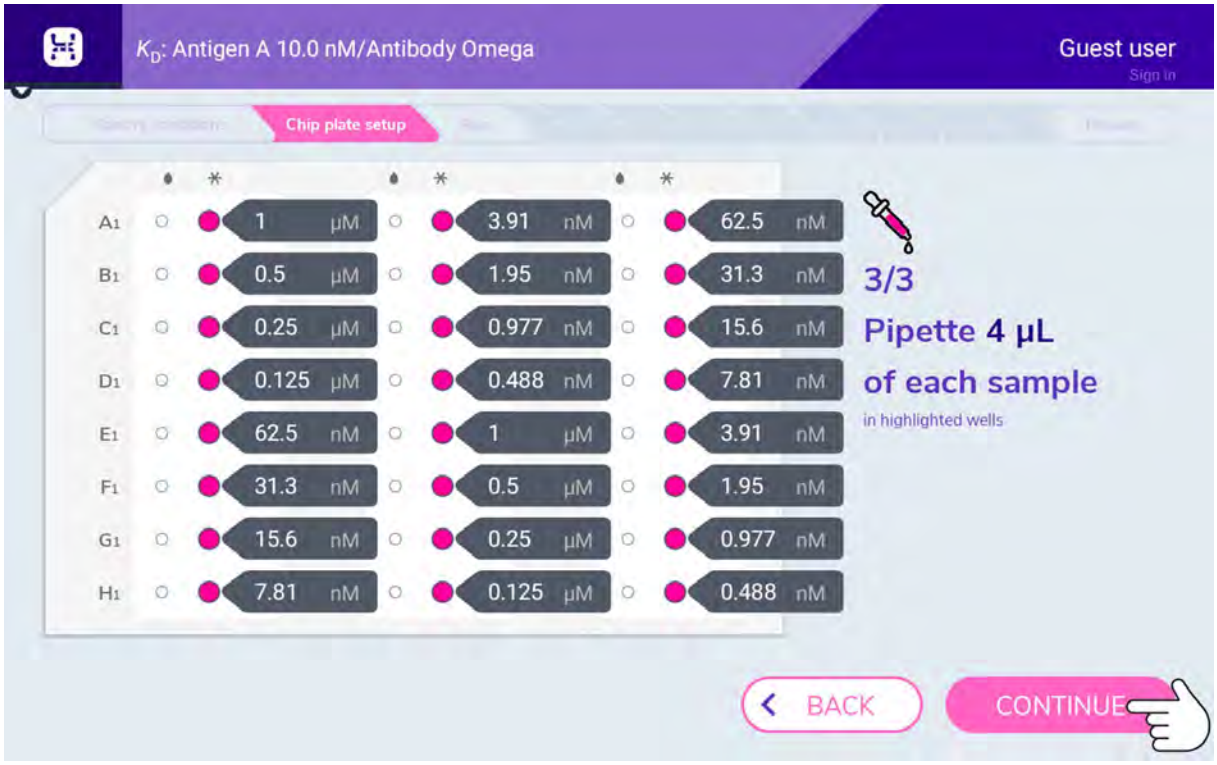
3. Hold the chip-plate near the NFC reader to detect which wells are available, and to check the expiration date (see page 25)
4. Select the first free circuit available
5. Select *CONTINUE*



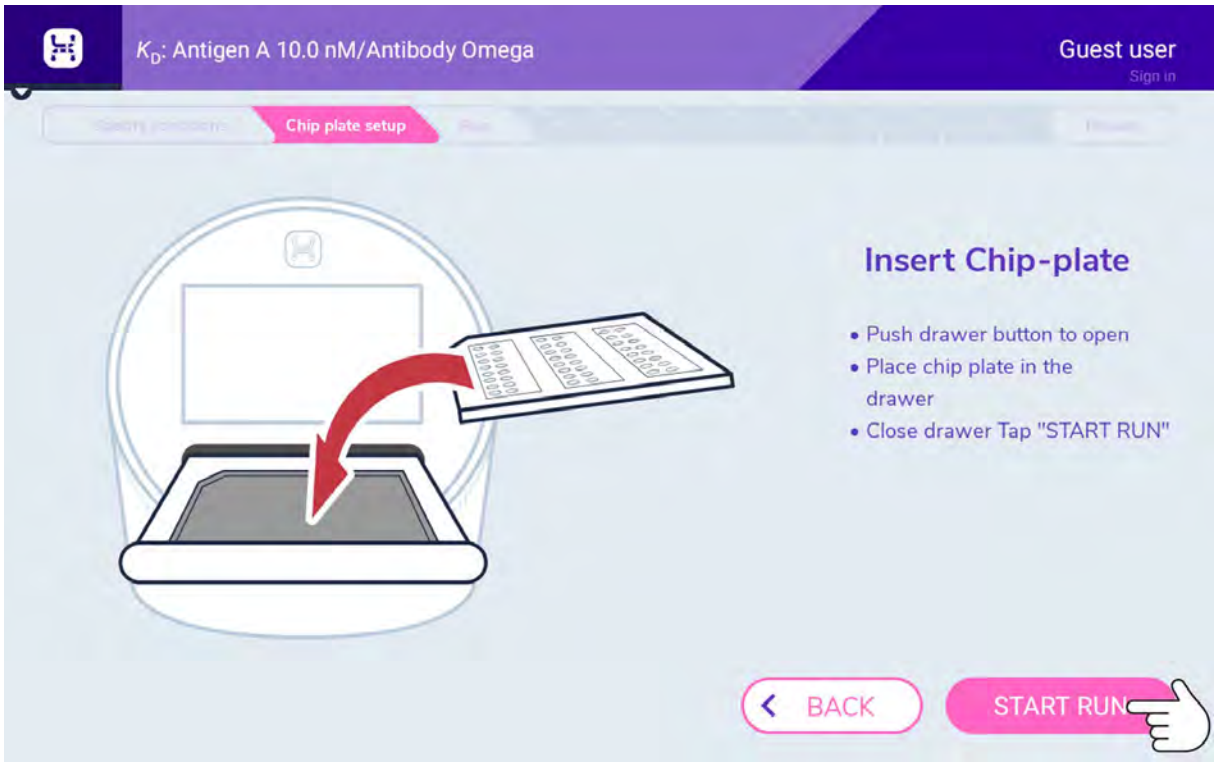
6. Pipette 4 µL of buffer into the highlighted wells
7. Select *CONTINUE*



8. Wait for the microfluidic channels to prime

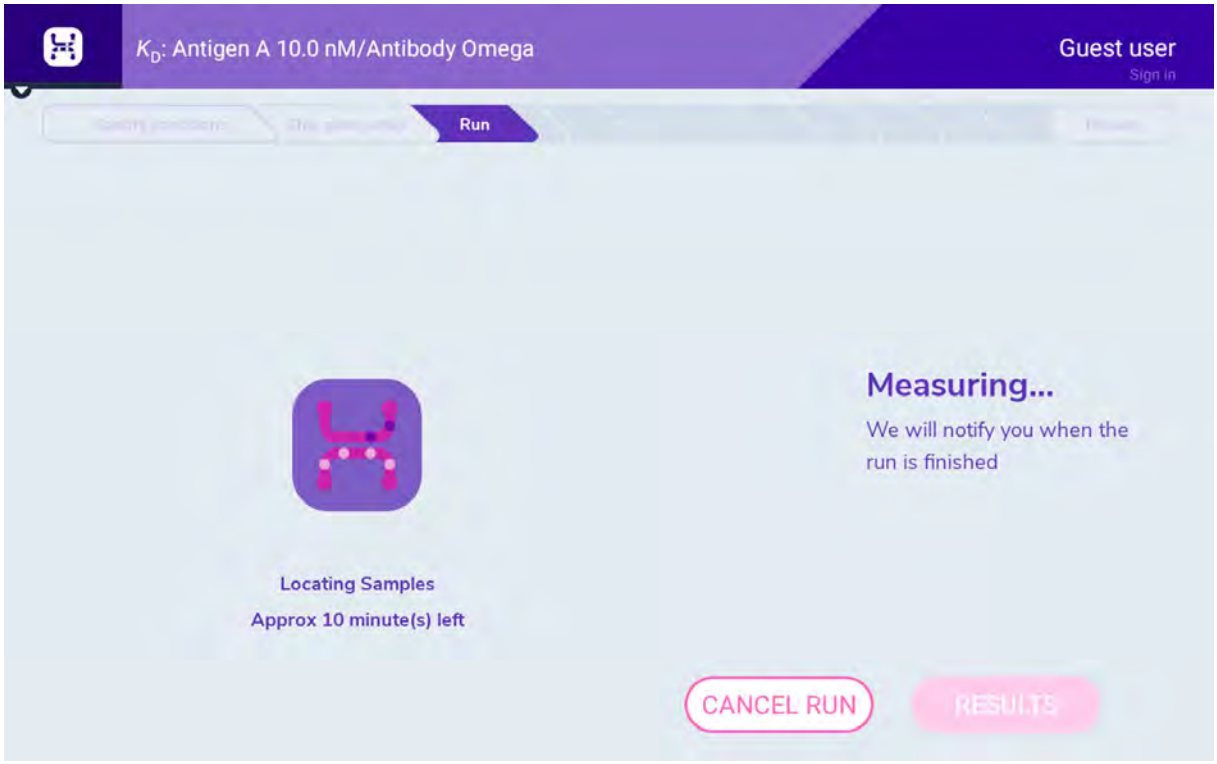


9. Pipette 4 µL of sample into the highlighted wells and select CONTINUE

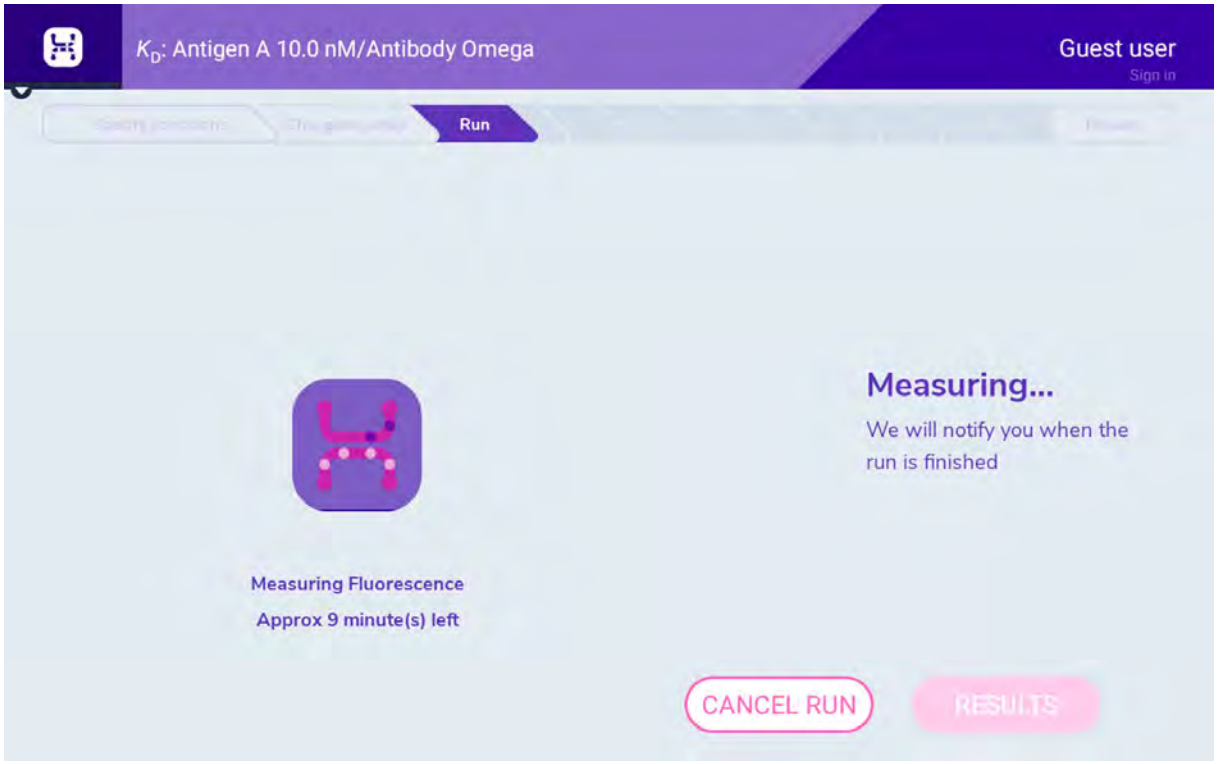


10. Insert Chip-plate into instrument:
    a. Push drawer button to open
    b. Insert chip-plate in the drawer
    c. Make sure that the chip-plate is fully seated
    d. Push drawer button to close
    e. Select *START RUN*

NOTE: Use of an expired chip-plate results in a notification pop up message; proceed in accordance with local protocols.



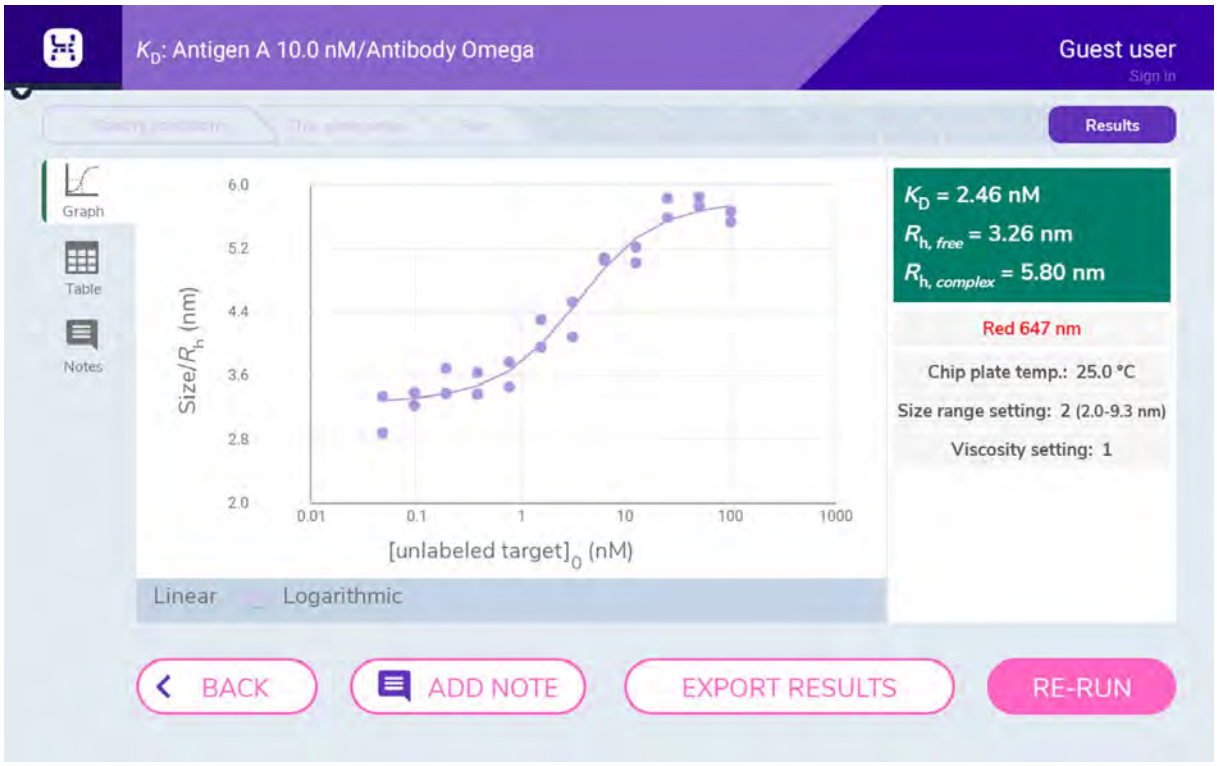
i. The instrument begins by locating the samples in the chip-plate



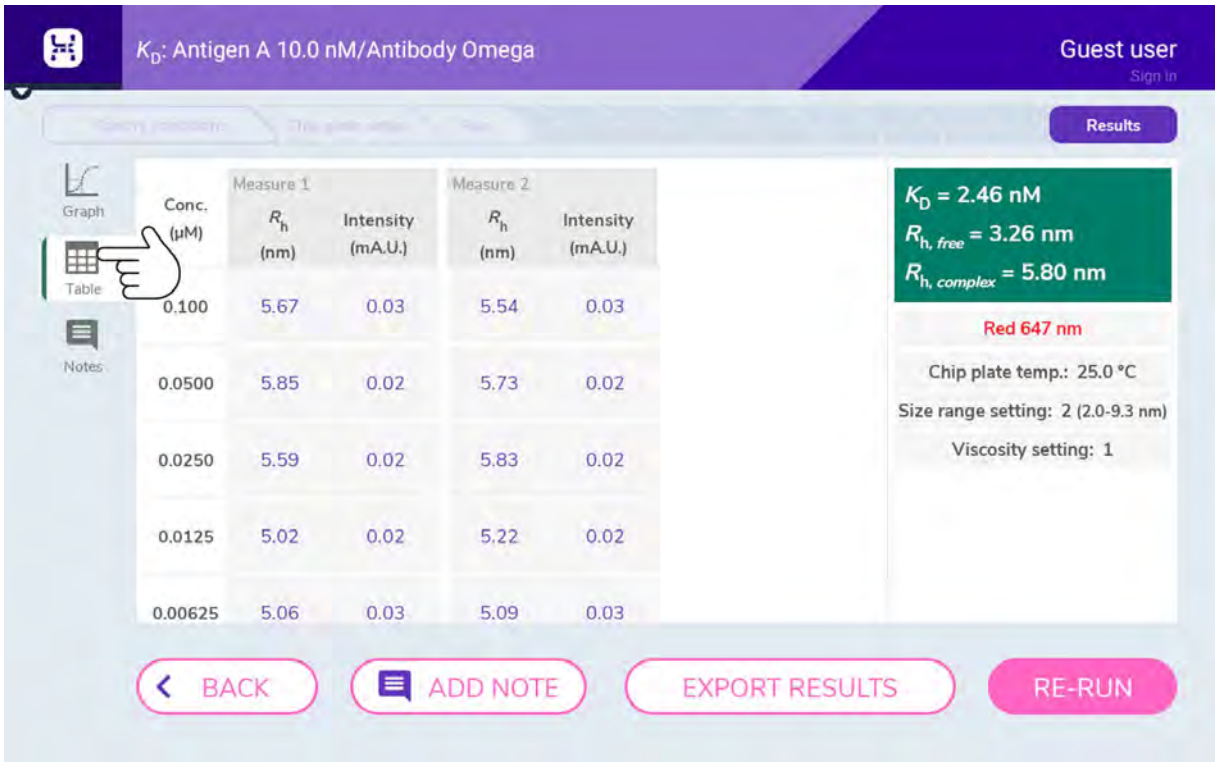
ii. Next the instrument measures the fluorescence after the run

11. Wait for measurement to complete

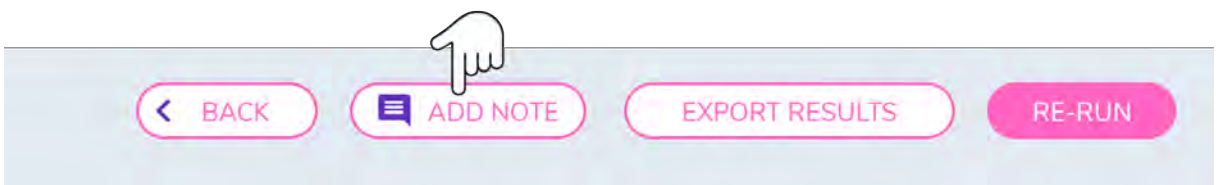
    When measurement is complete, results will be displayed automatically.



The graphed results screen appears and displays calculated K_D.



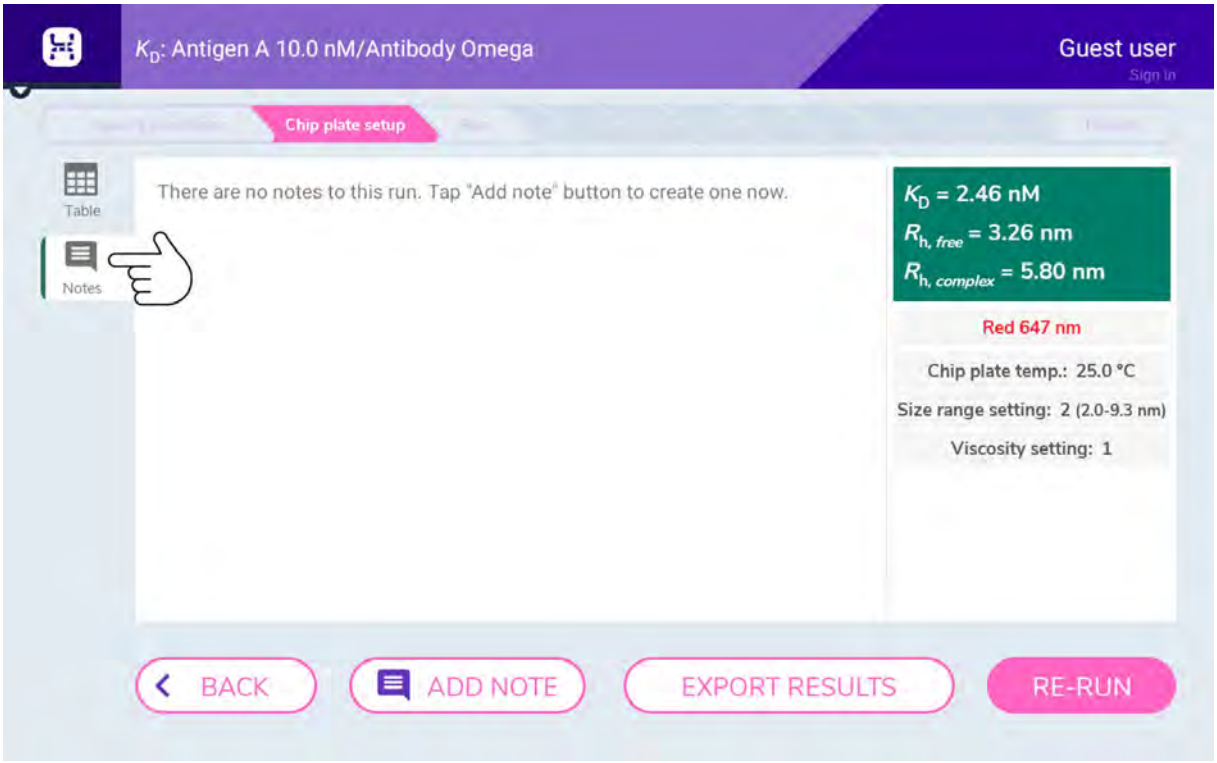
12. Select *Table* icon to view data



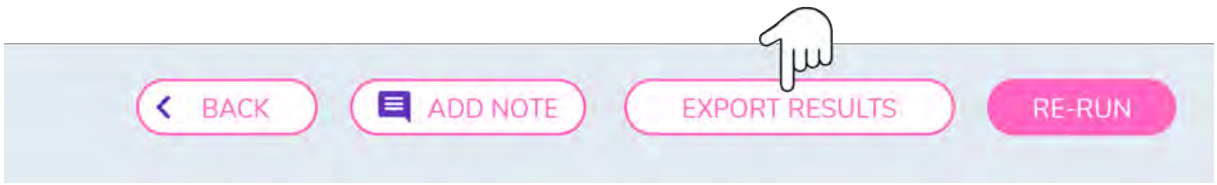
13. If required, select *ADD NOTE* to add a note to the run



14. Under *Add a note* > enter your note for the run, then select *ADD* to save the note

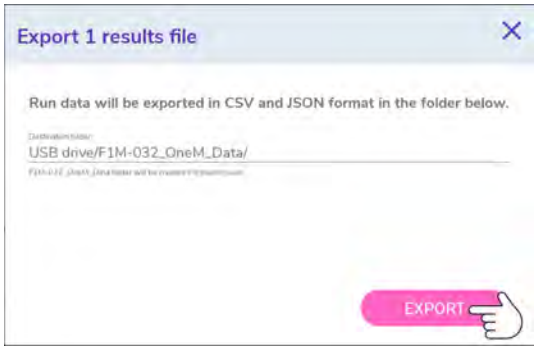


15. Select *Notes* icon to view notes included with the run
16. Connect a flash drive to the USB port



17. Select *EXPORT RESULTS*
18. Navigate to destination folder

    NOTE: A folder with the instrument name will be created automatically on the flash drive if it doesn't exist.



19. Select *EXPORT*

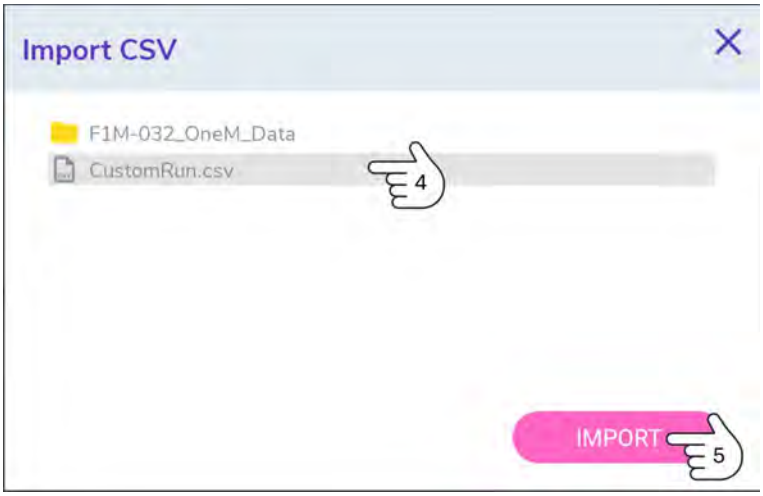
    When file export is complete, the *Export Successful* screen appears.



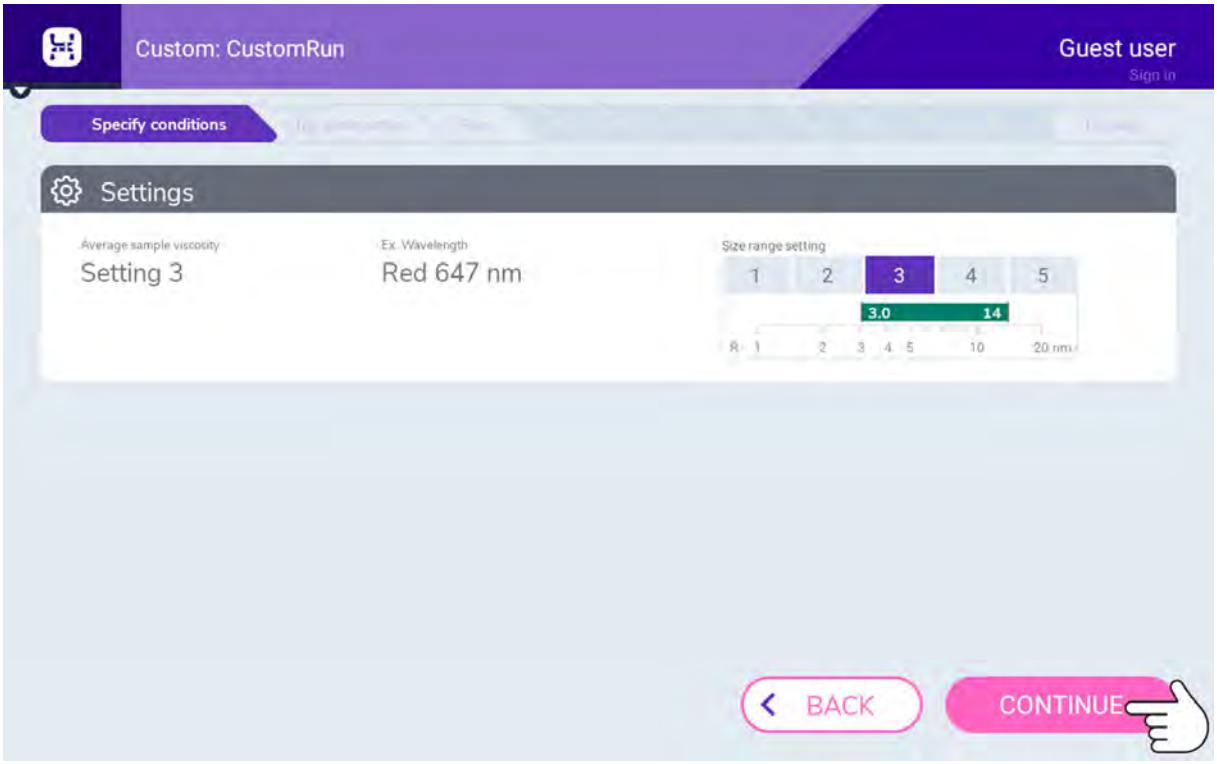
20. Select *OK* to exit

Set up *Custom import* run

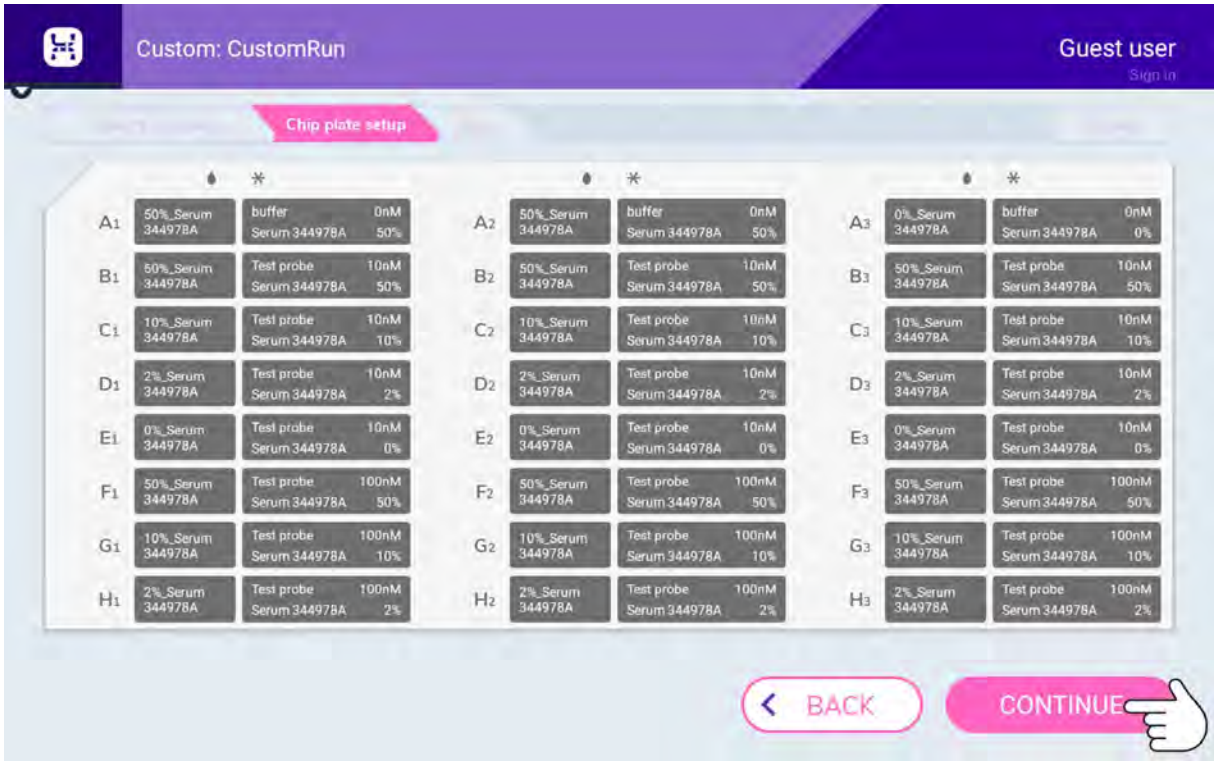
1. Generate a custom import CSV file using the template generation worksheet provided. If you do not have a suitable template generation worksheet, please contact technical support (techsupport@fluidic.com) who will provide the required worksheet(s).
2. Save the CSV file to a flash-drive
3. Connect flash-drive to the USB port on the instrument



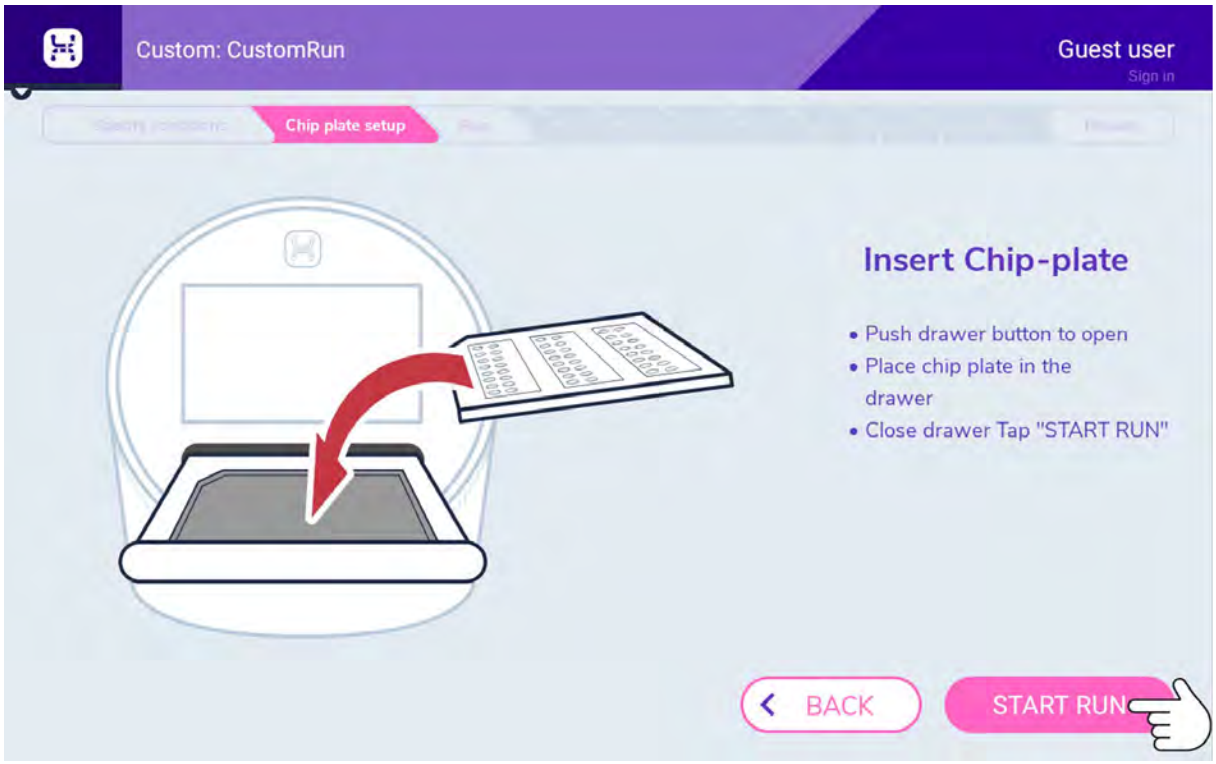
4. Select file to be imported
5. Select *IMPORT*



6. Select *CONTINUE*
7. Hold the chip-plate near the NFC reader to detect which wells are available, and to check the expiration date (see page 25)
8. Pipette flow buffer into microfluidic channels
9. Wait for the microfluidic circuits to prime
10. Pipette sample into microfluidic channels



11. Select CONTINUE



12. Insert chip-plate:

    a. Push drawer button to open

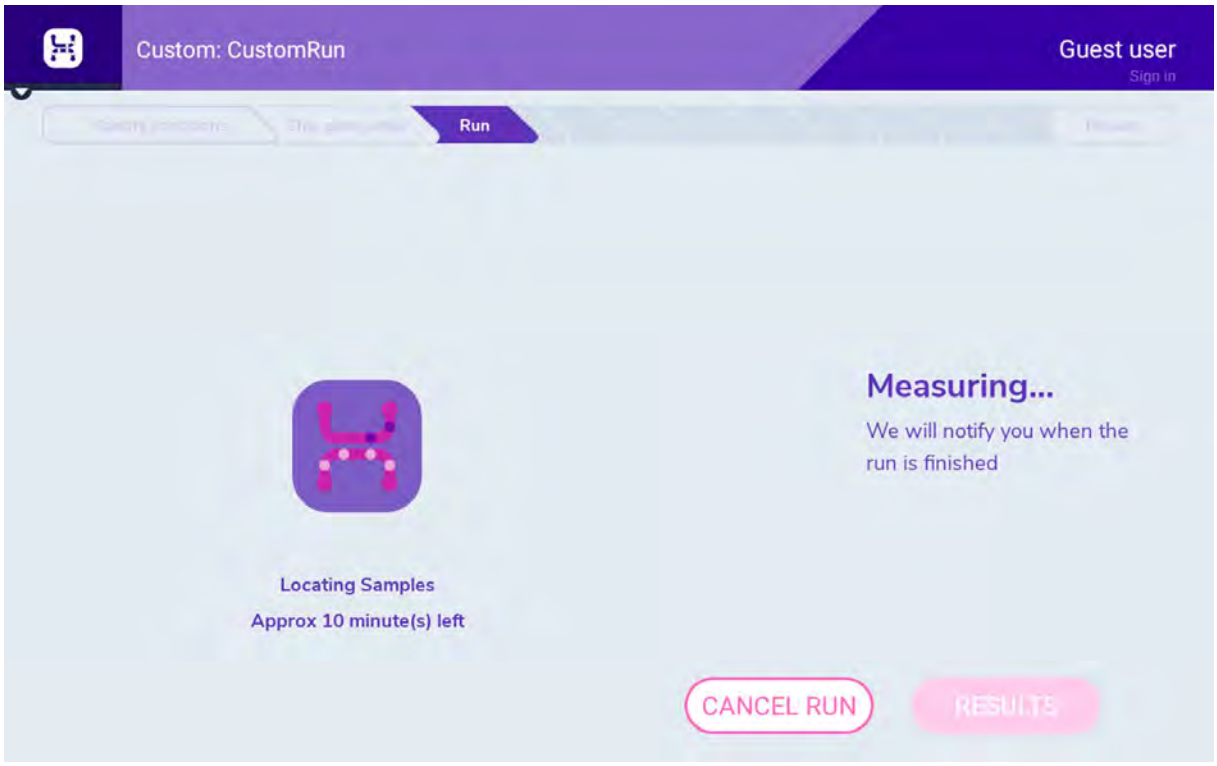
    b. Insert chip-plate in the drawer

    c. Make sure that the chip-plate is fully seated

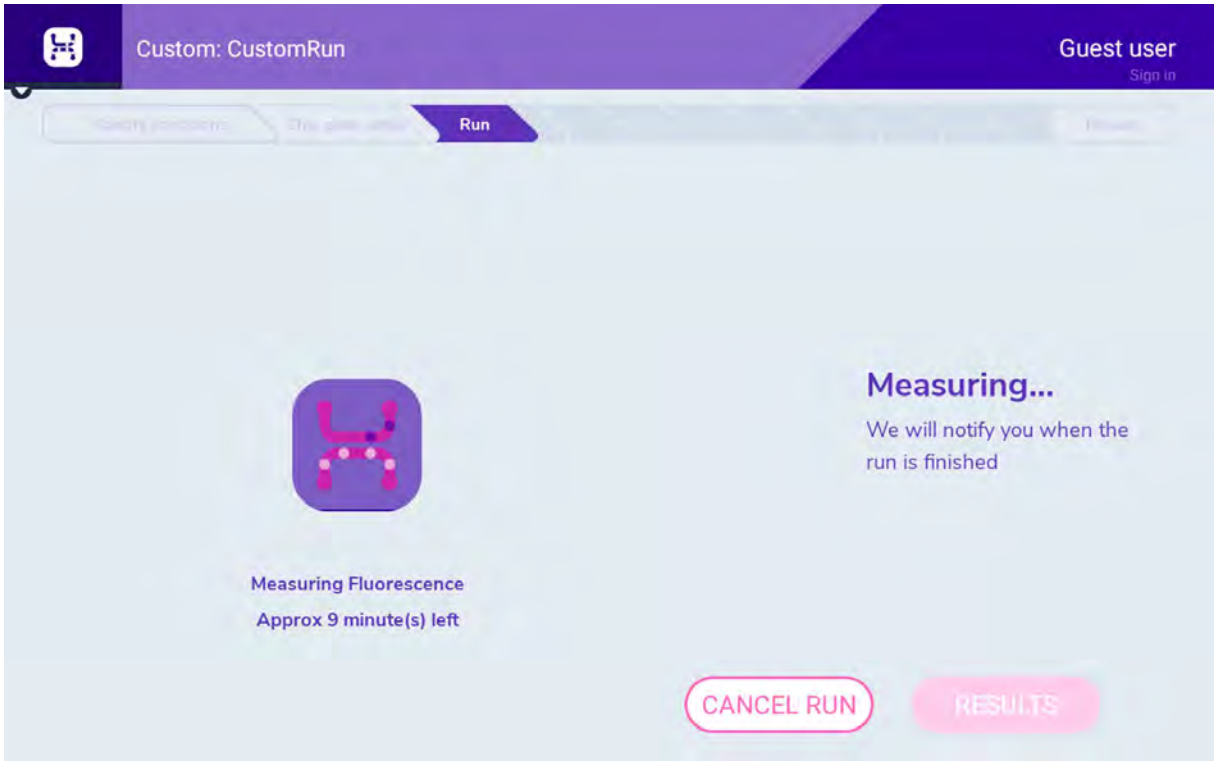
    d. Push drawer button to close

    e. Select *START RUN*

    NOTE: Use of an expired chip-plate results in a notification pop up message; proceed in accordance with local protocols.

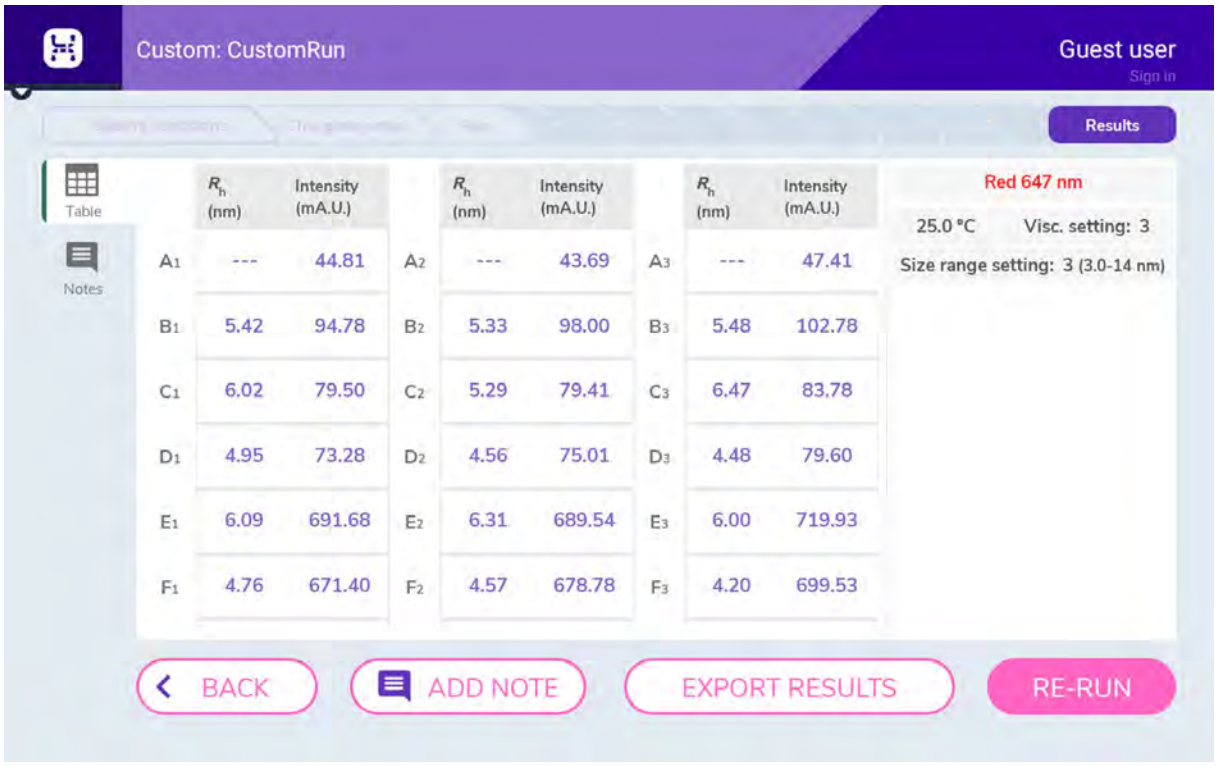


i. The instrument begins by locating the samples in the chip-plate



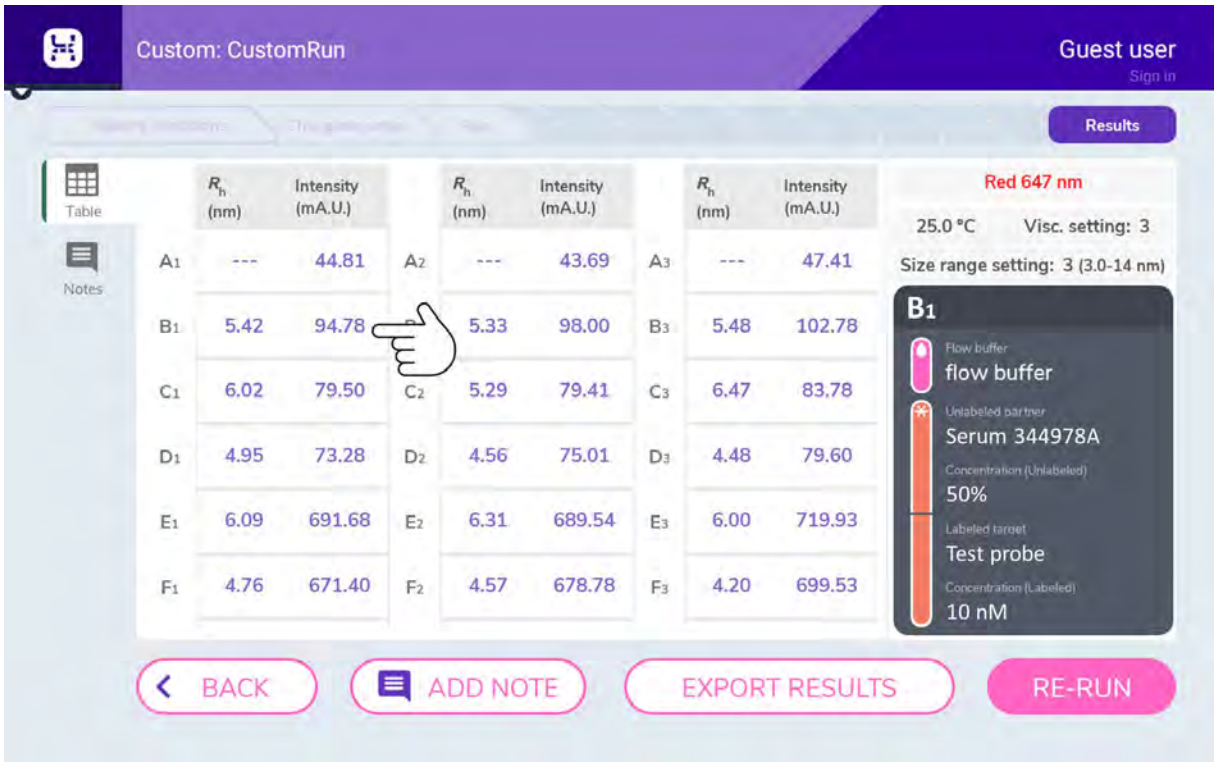
ii. Next the instrument measures the fluorescence after the run

13. Wait for measurement to complete



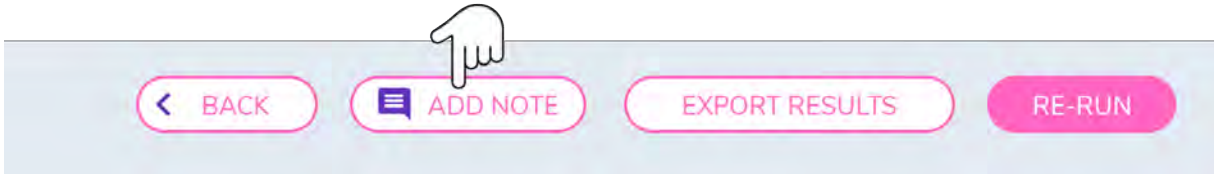
	R_h (nm)	Intensity (mA.U.)		R_h (nm)	Intensity (mA.U.)		R_h (nm)	Intensity (mA.U.)
A1	---	44.81	A2	---	43.69	A3	---	47.41
B1	5.42	94.78	B2	5.33	98.00	B3	5.48	102.78
C1	6.02	79.50	C2	5.29	79.41	C3	6.47	83.78
D1	4.95	73.28	D2	4.56	75.01	D3	4.48	79.60
E1	6.09	691.68	E2	6.31	689.54	E3	6.00	719.93
F1	4.76	671.40	F2	4.57	678.78	F3	4.20	699.53

When measurement is complete, results will be displayed automatically



	R_h (nm)	Intensity (mA.U.)		R_h (nm)	Intensity (mA.U.)		R_h (nm)	Intensity (mA.U.)
A1	---	44.81	A2	---	43.69	A3	---	47.41
B1	5.42	94.78	B2	5.33	98.00	B3	5.48	102.78
C1	6.02	79.50	C2	5.29	79.41	C3	6.47	83.78
D1	4.95	73.28	D2	4.56	75.01	D3	4.48	79.60
E1	6.09	691.68	E2	6.31	689.54	E3	6.00	719.93
F1	4.76	671.40	F2	4.57	678.78	F3	4.20	699.53

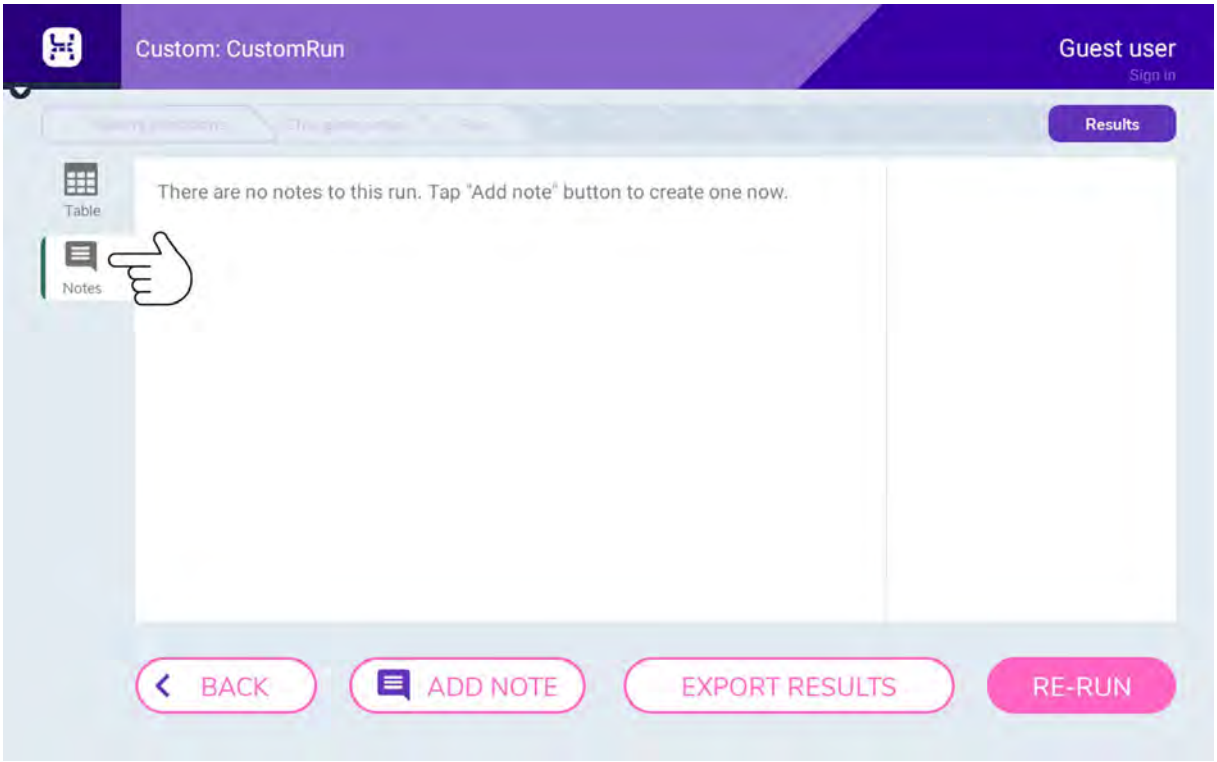
Press data field in Table to view sample information



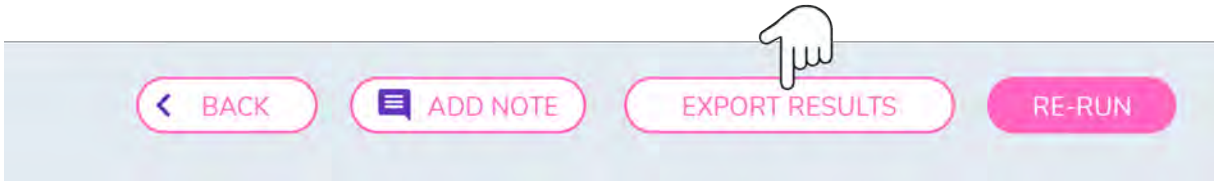
14. If required, select *ADD NOTE* to add a note to the run



15. Under Add a note > enter your notes for the run, then select *ADD* to save the note

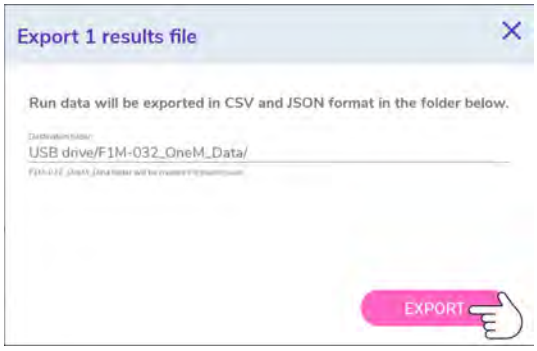


16. Select *Notes* icon to view notes included with the run
17. Connect a flash drive to the USB port



18. Select *EXPORT RESULTS*
19. Navigate to destination folder

    NOTE: A folder with the instrument name will be created automatically on the flash drive if it doesn't exist.



20. Select *EXPORT*



When file export is complete, the *Export Successful* screen appears.

21. Select *OK* to exit.

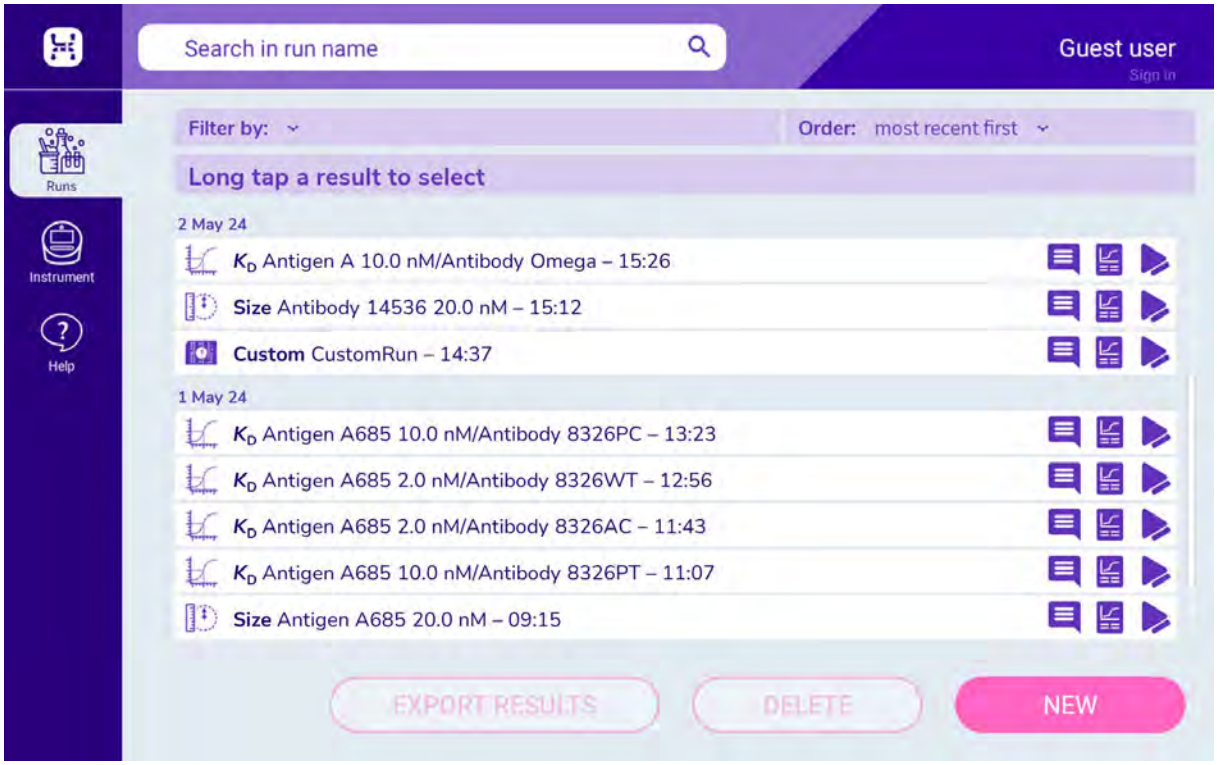
Managing Results

The results from previous runs are available to navigate, export, delete or to add / change notes.

1. Open navigation screen



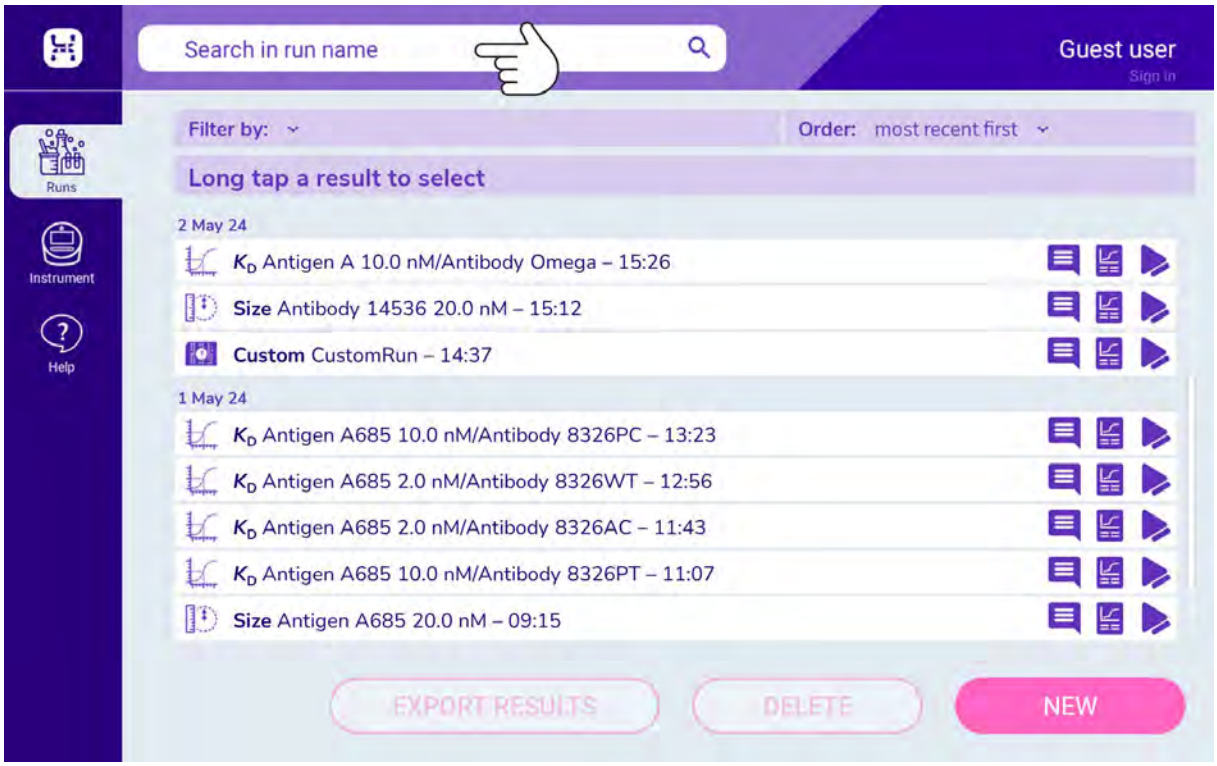
2. Select *Runs* icon



The following options are available to navigate and manage previous runs:

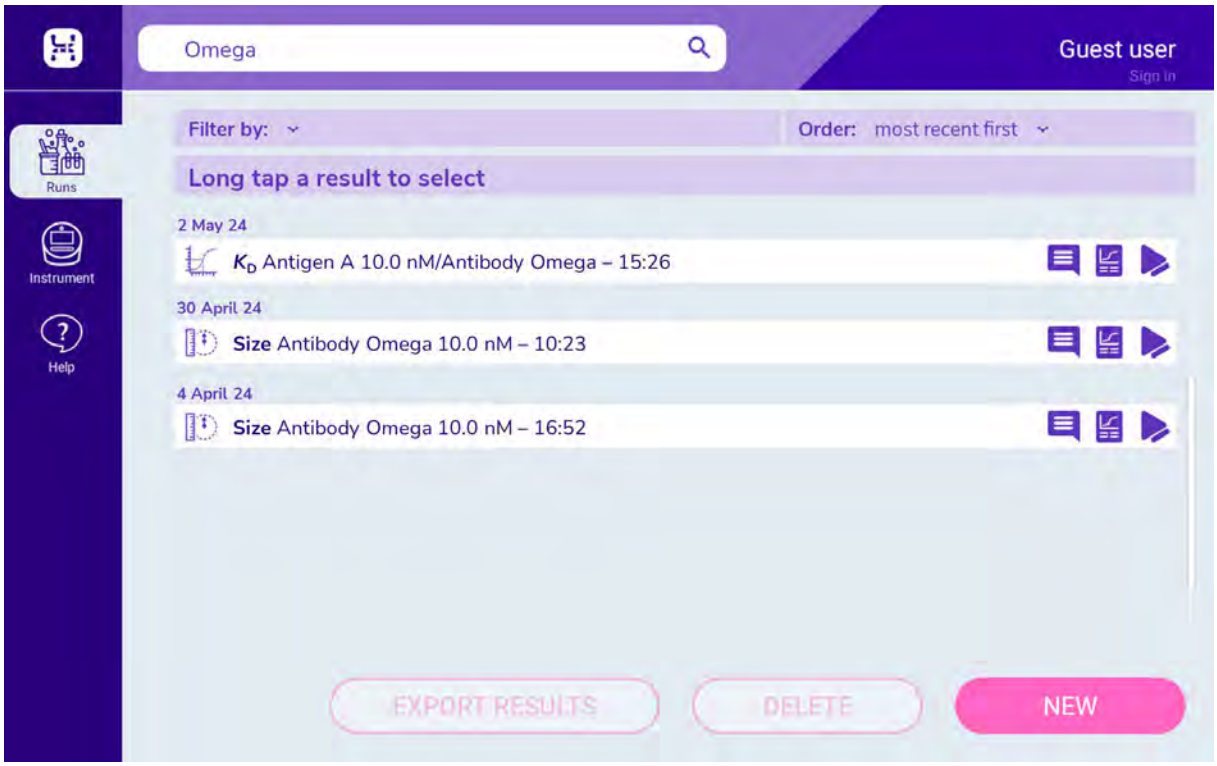
- Search the results for a previous run.
- Filter the results shown by preset.
- Order results shown by time (most recent or oldest first).
- Export results.
- Delete results.
- Add, delete or change result notes.

Search results



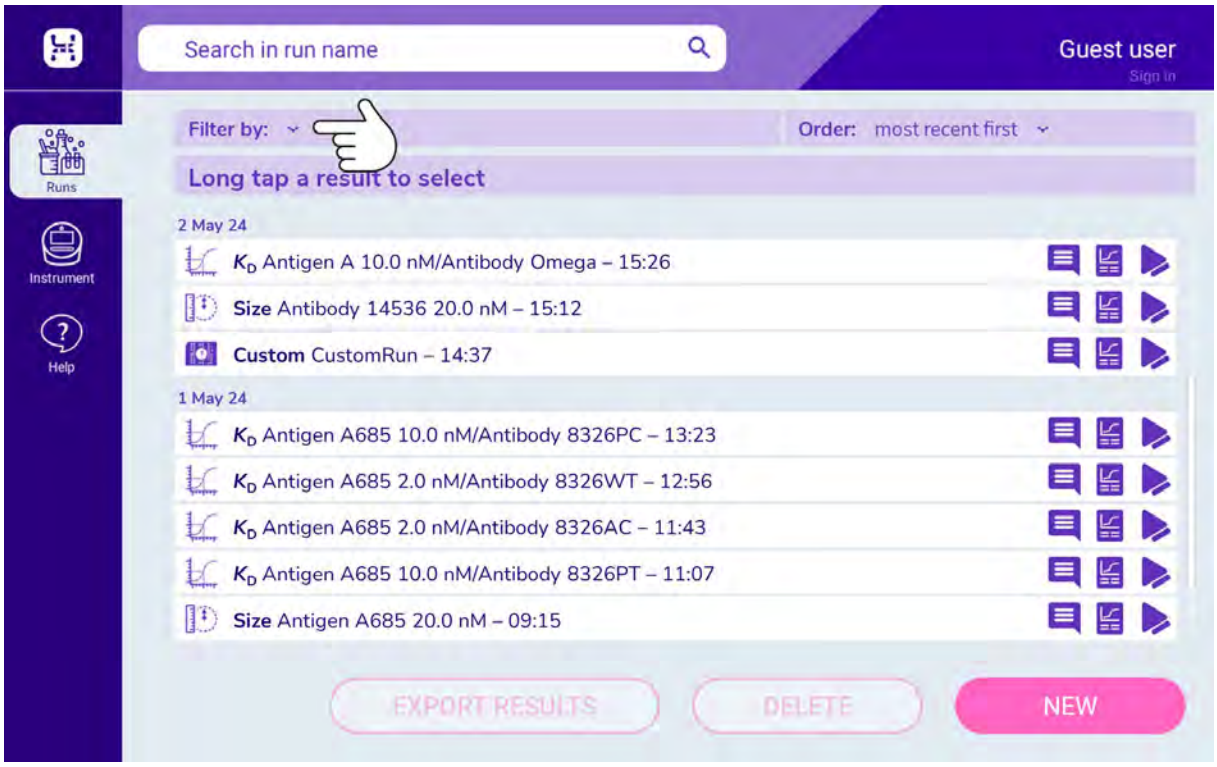
1. Type in part or all the run name

   Note: To delete the search, delete the text in the search field.

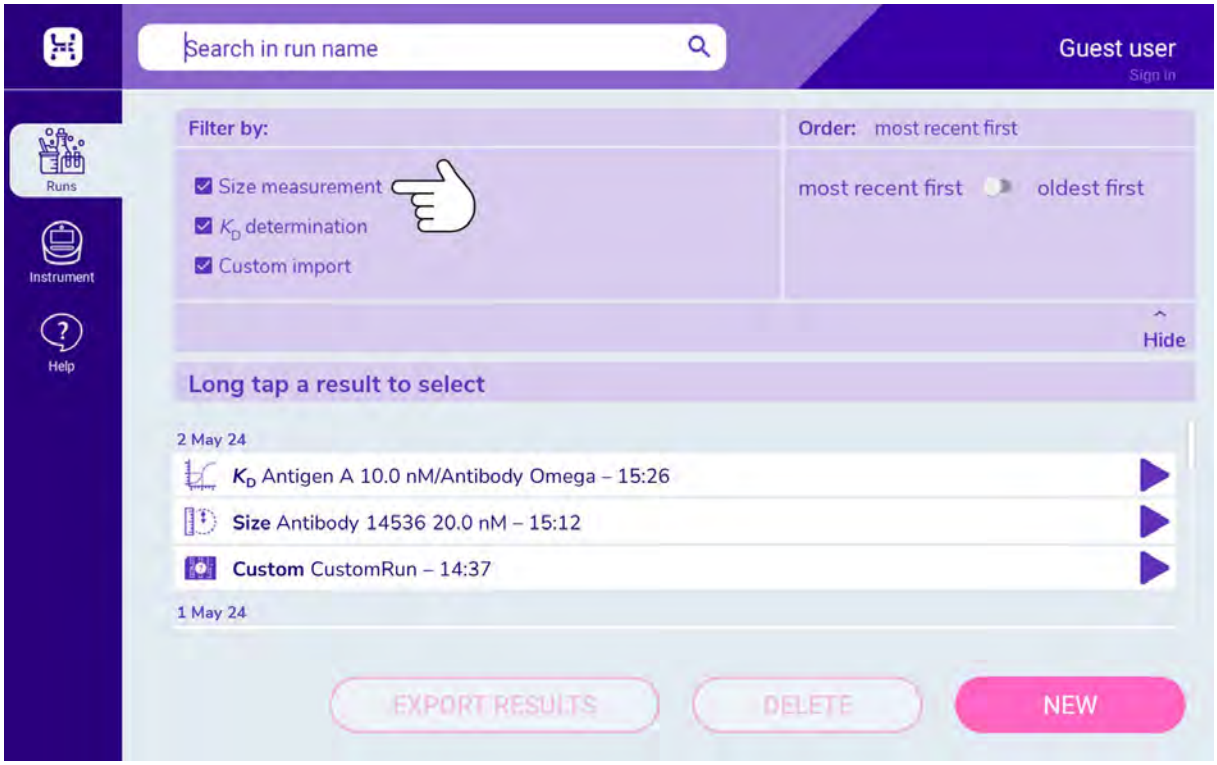


   The results list shows the outcome of the search.

Filter results shown by preset

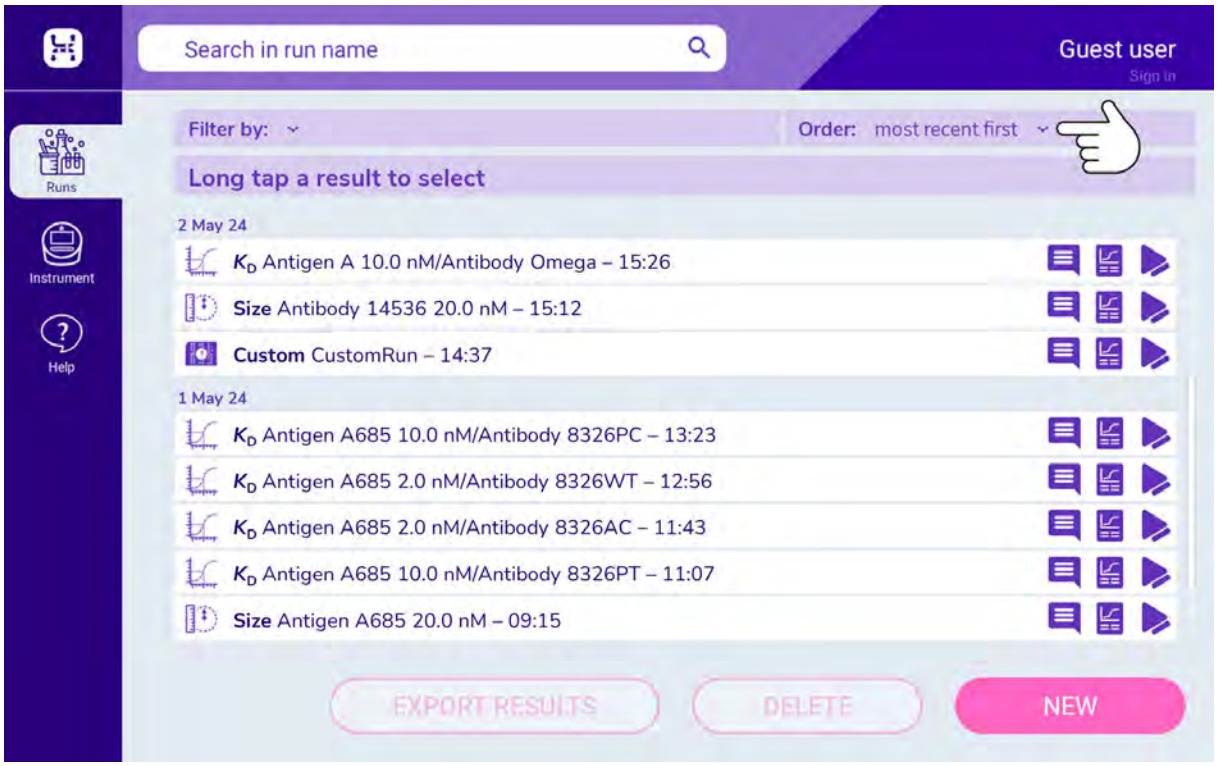


1. Select *Filter by:* to sort by run preset in the results list

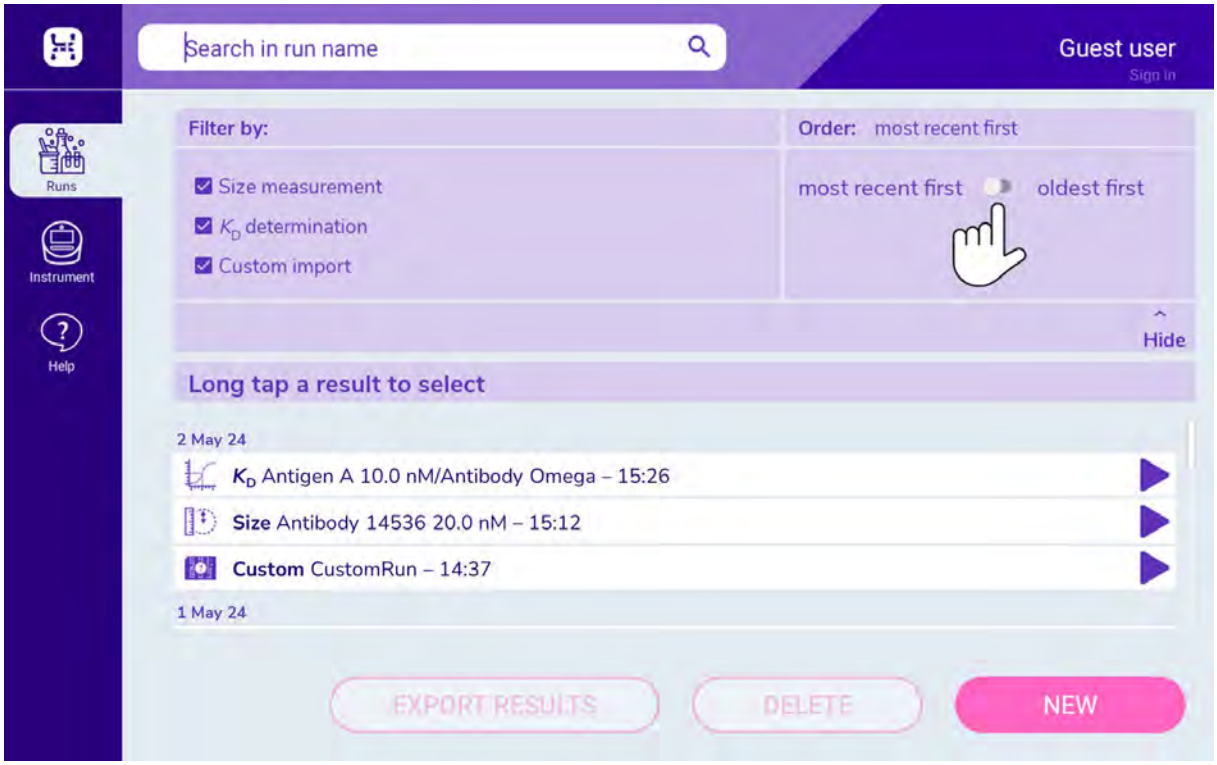


2. Select or unselect required run preset to show only the runs from the chosen preset

Order results shown by time



1. Select *Order:* to open ordering options

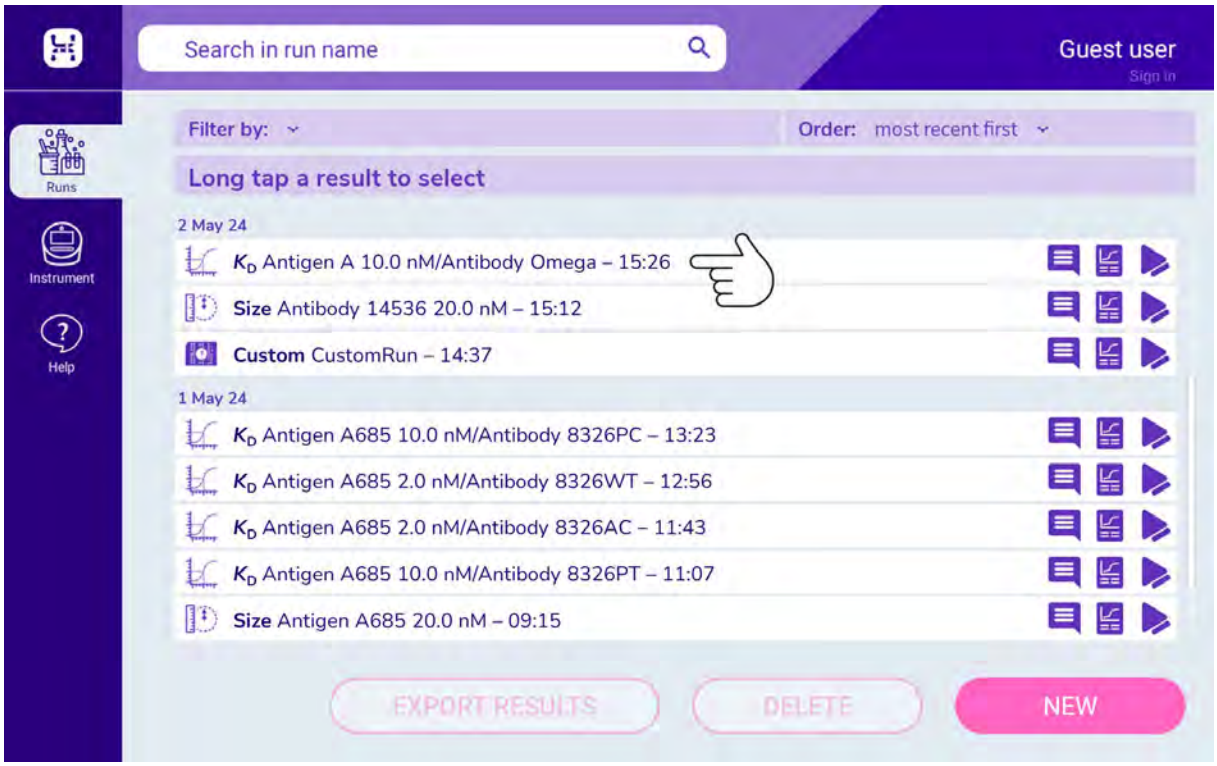


2. Move toggle to swap between most recent first or oldest first runs shown in the result list

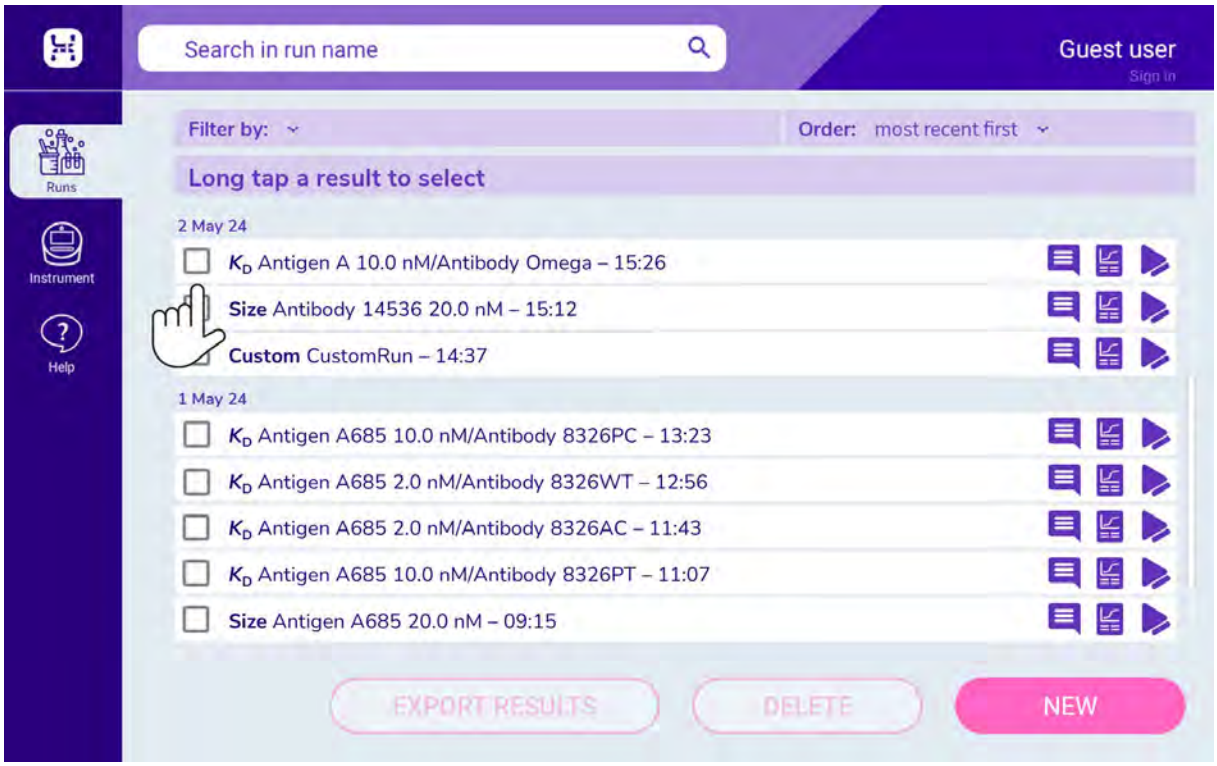
Export results

One or more results files can be exported to a flash drive. Three files are created from each run: JSON file, CSV file and F1M file. The JSON file is uploaded to Fluidity Intelligence for use with advanced analytical tools; for further information on Fluidity Intelligence refer to document: User guide for Fluidity Intelligence IFU-0016. The CSV file provides a convenient method to transfer results into third party data analysis tools. The F1M file contains run log information and is used by Fluidic Sciences technical support staff.

Note: The exported results are not removed from the instrument.



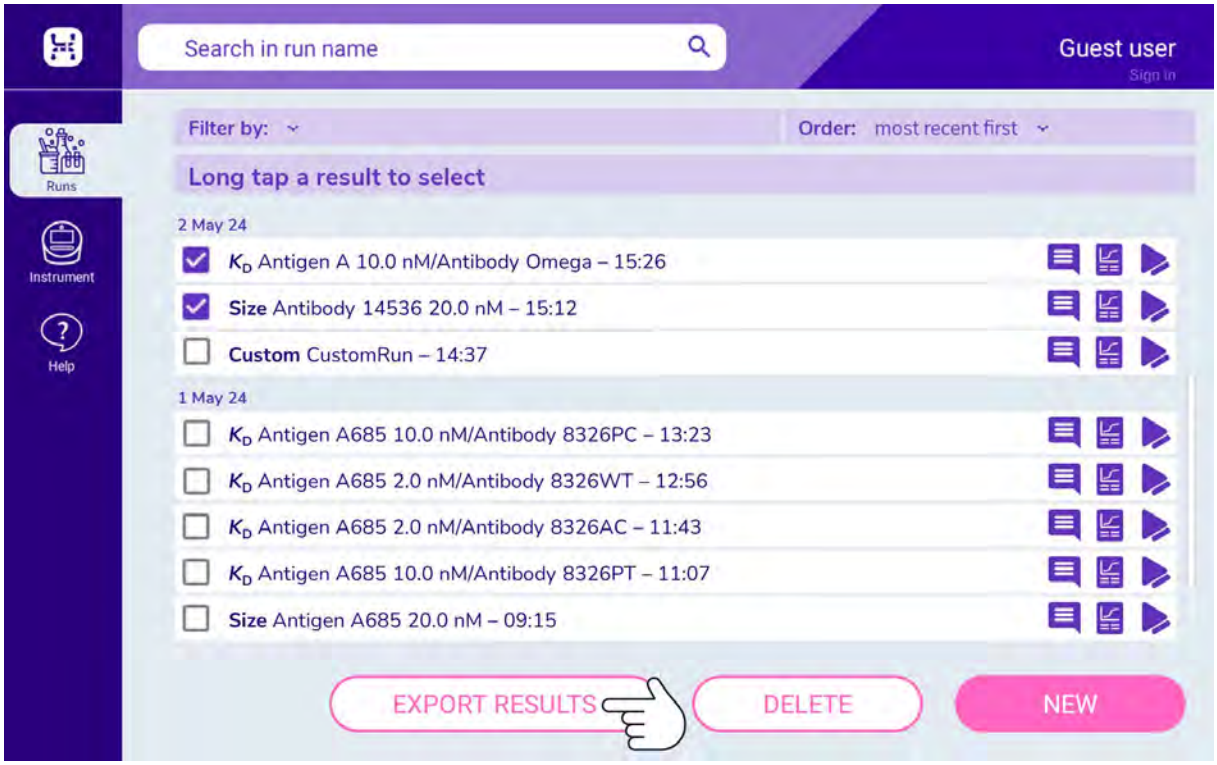
1. Press and briefly hold a run in the results list to enable the selection choice option



2. Choose one or more runs for export

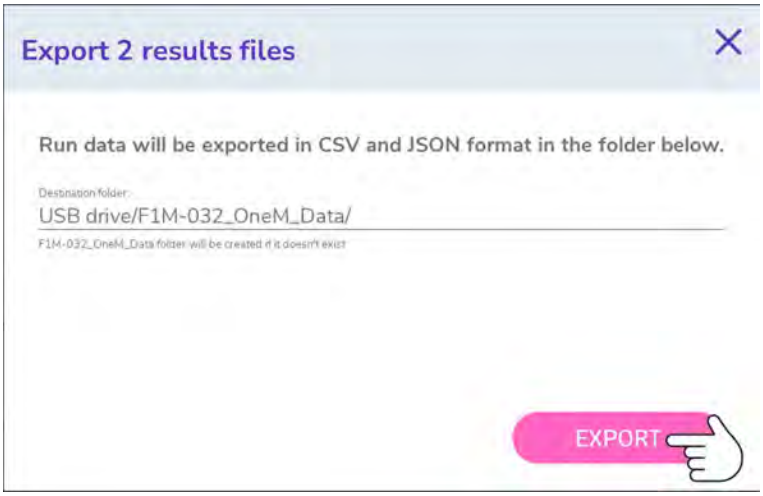
   Note: it is not possible to export preset templates.

3. Connect a flash drive to the USB port



4. Select *EXPORT RESULTS*

   NOTE: A folder with the instrument name will be created automatically on the flash drive if it doesn't exist.



5. Select *EXPORT*



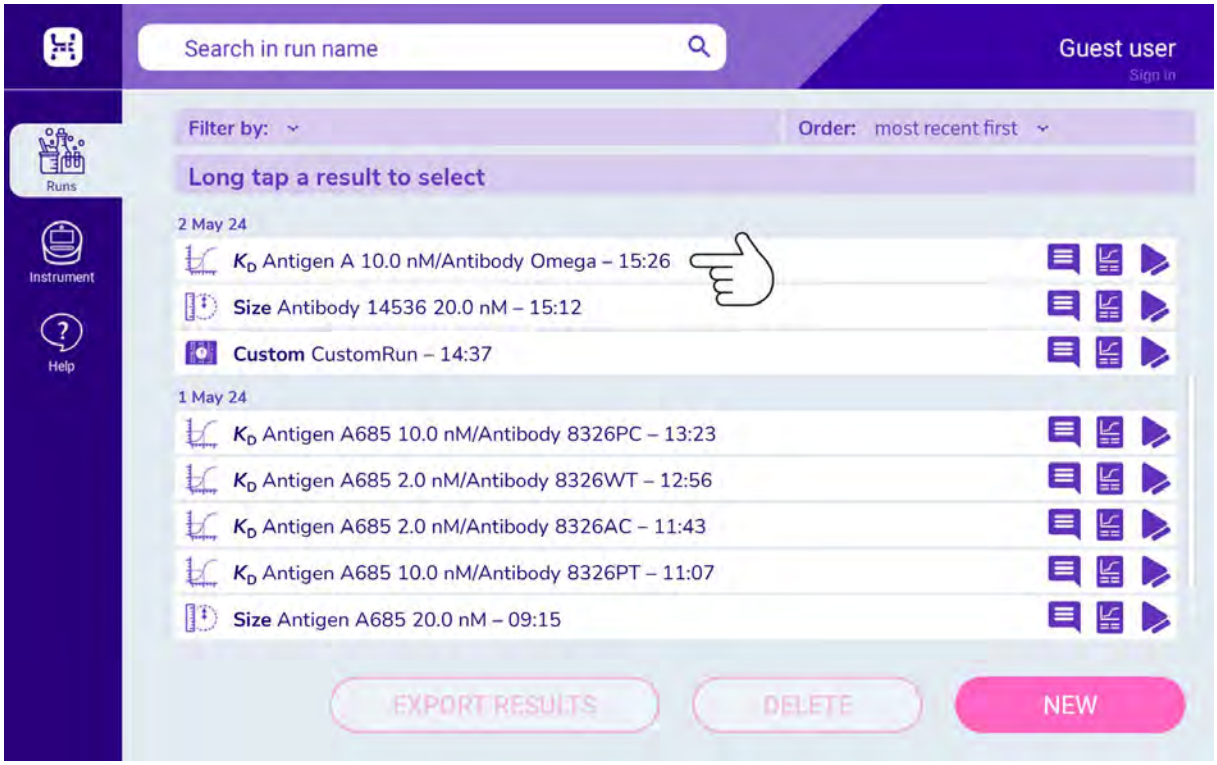
When the export is complete, the *Export Successful* screen appears.

6. Select OK to exit

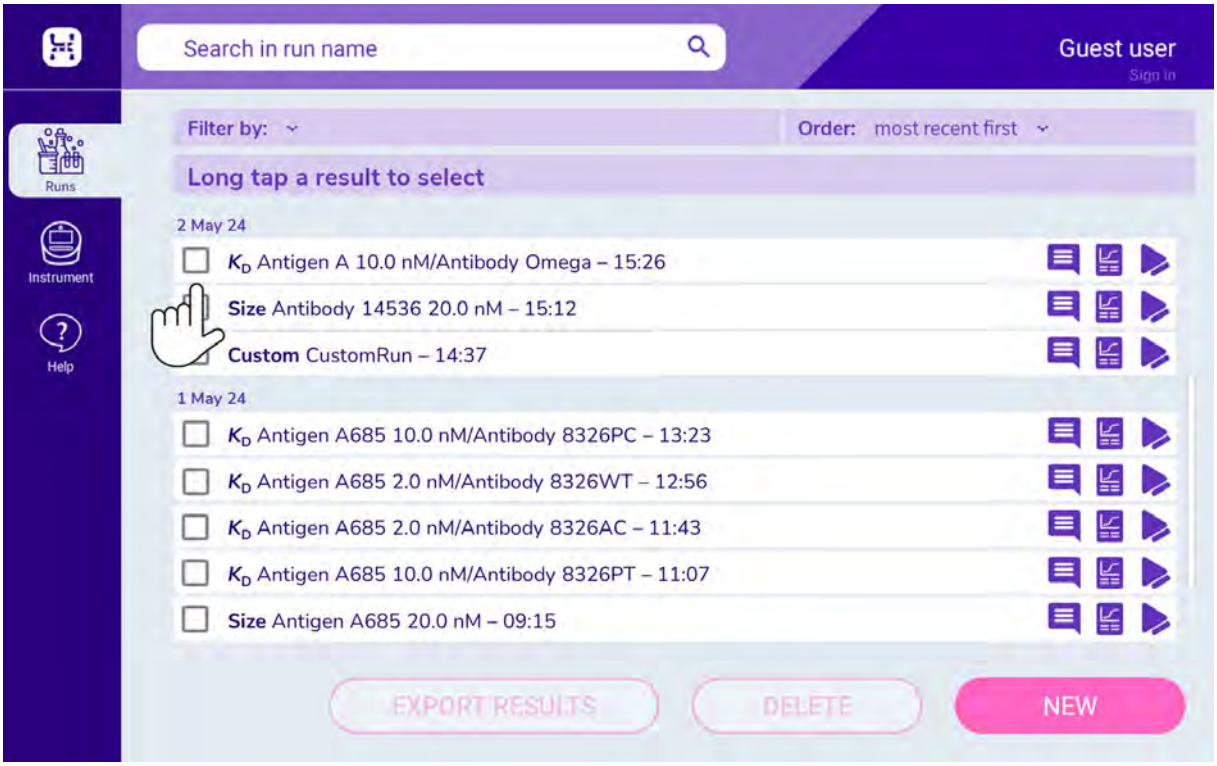
Delete results or templates

One or more results or templates can be deleted from the instrument.

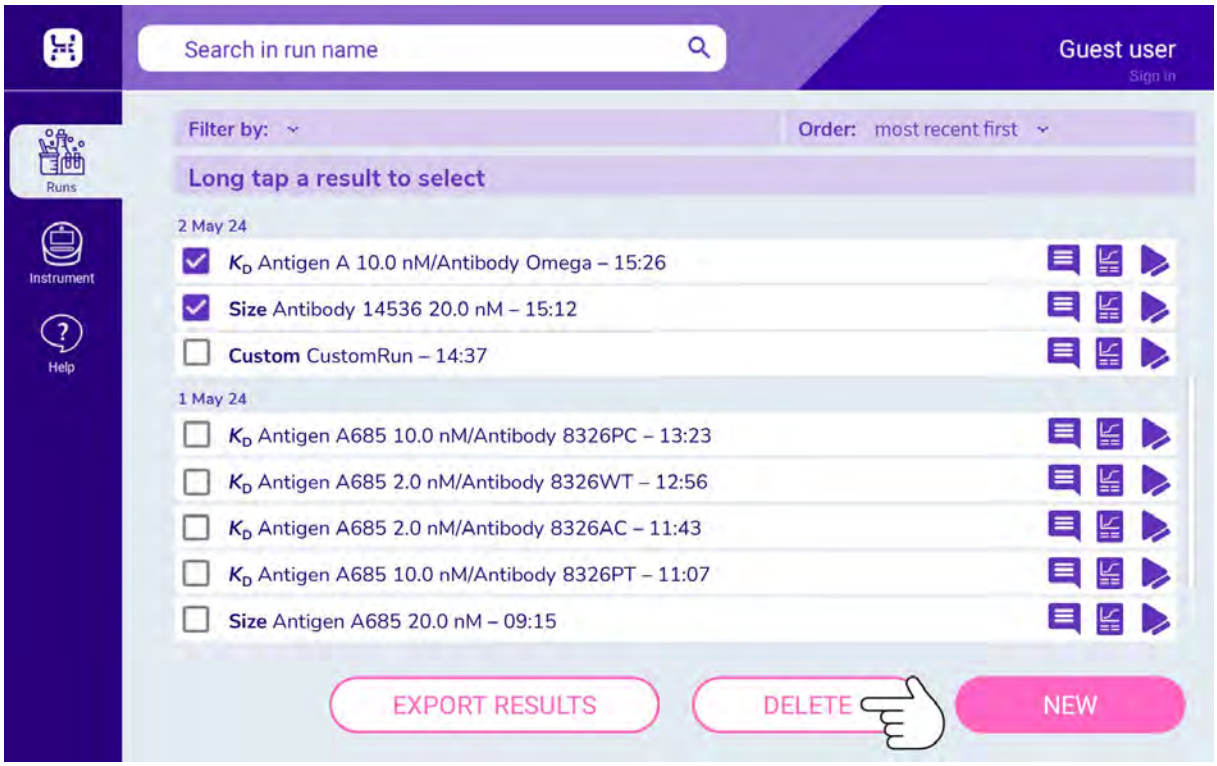
Note: Results cannot be recovered once deleted.



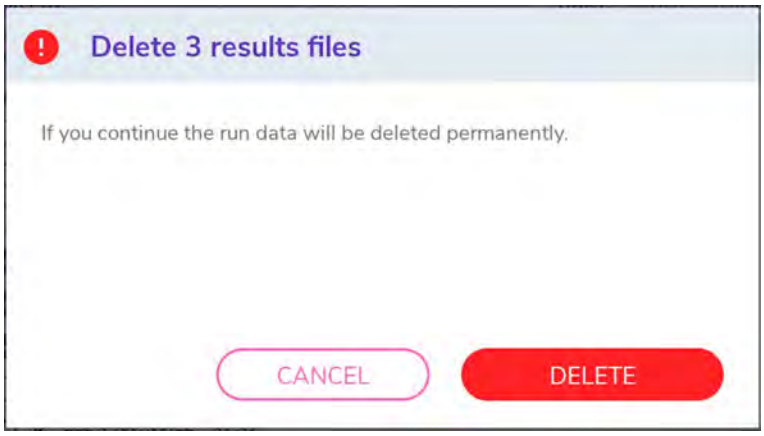
1. Press and briefly hold a run in the list to enable the selection choice option



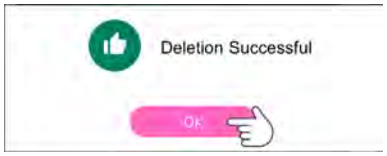
2. Choose one or more files for deleting



3. Select *DELETE*



4. Select *DELETE* to confirm deletion of the result

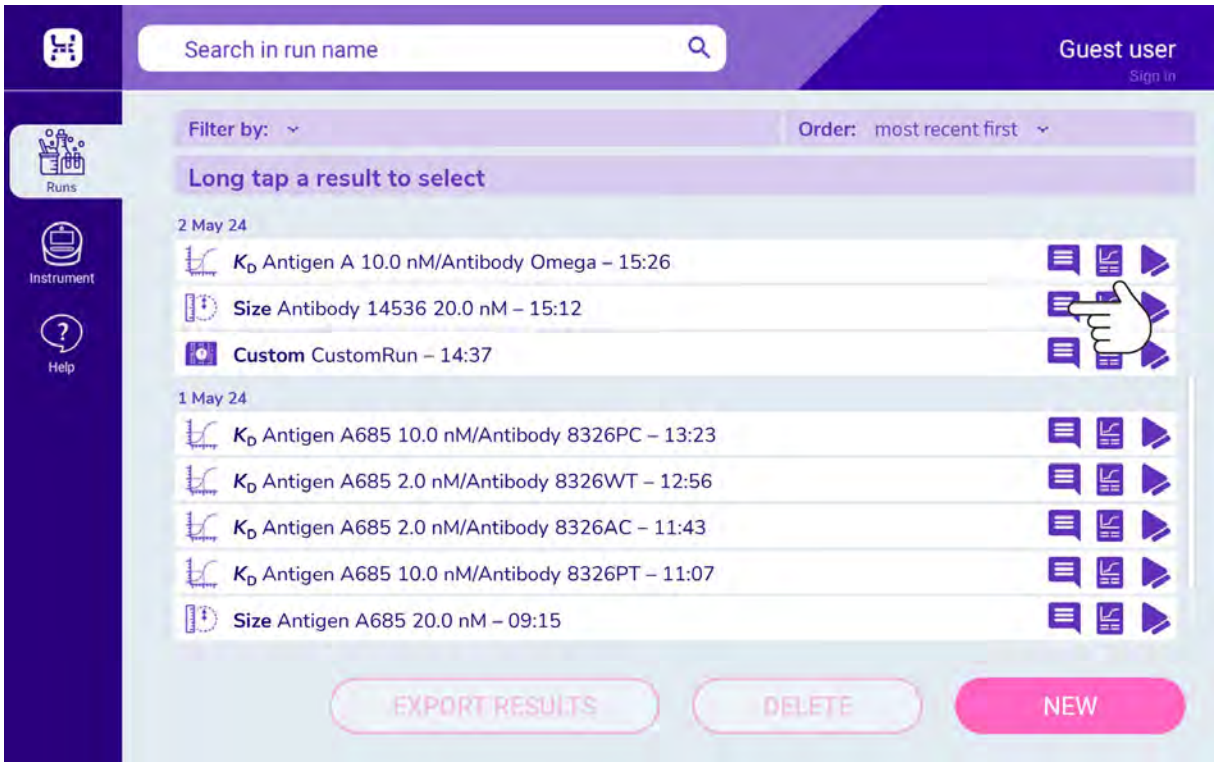


When the result deletion is complete, the *Deletion Successful* screen appears.

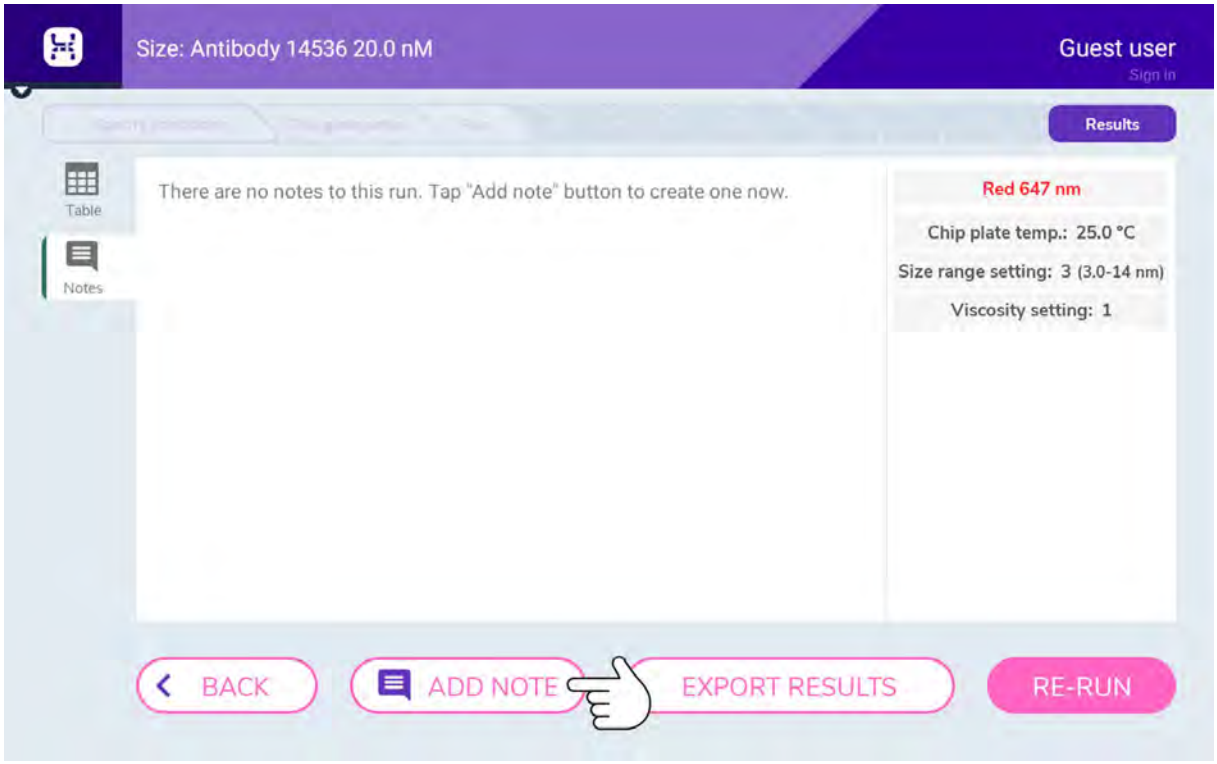
5. Select OK to exit

Add, delete or change result notes

Notes accompanying the run can be added, deleted, or changed.



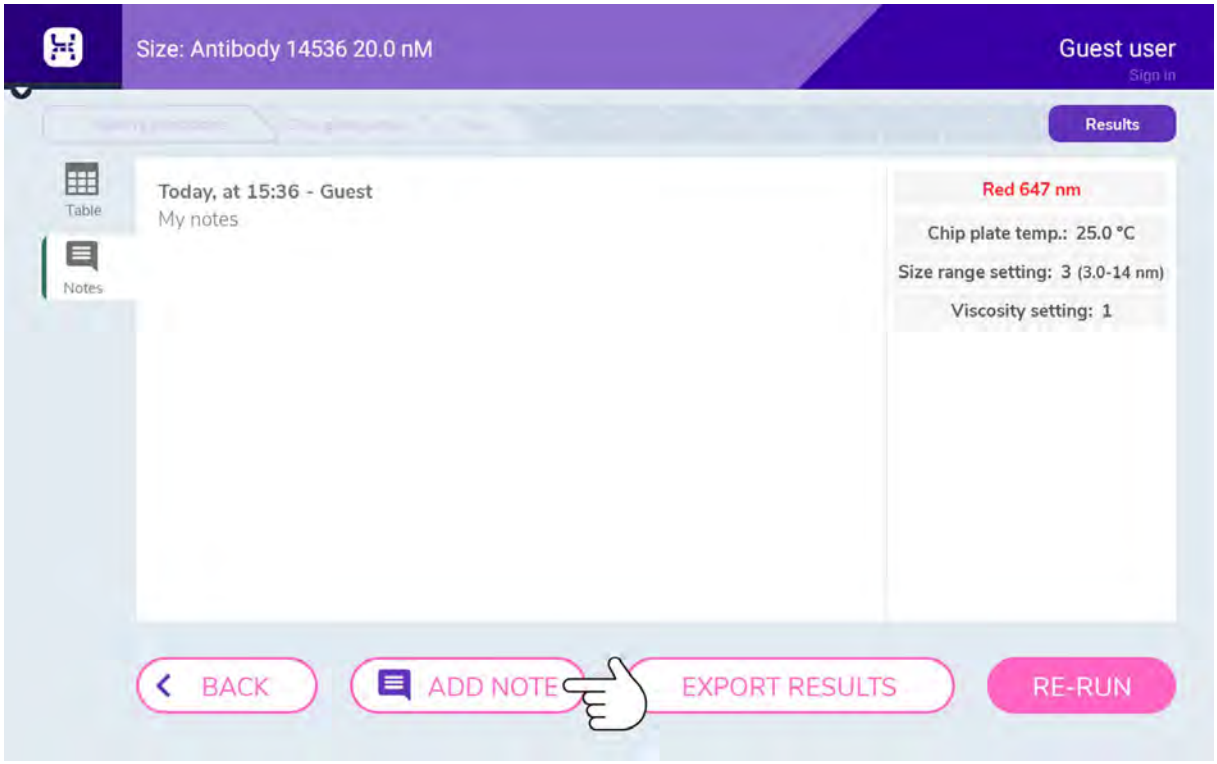
1. Select *notes icon* for the run in the results list



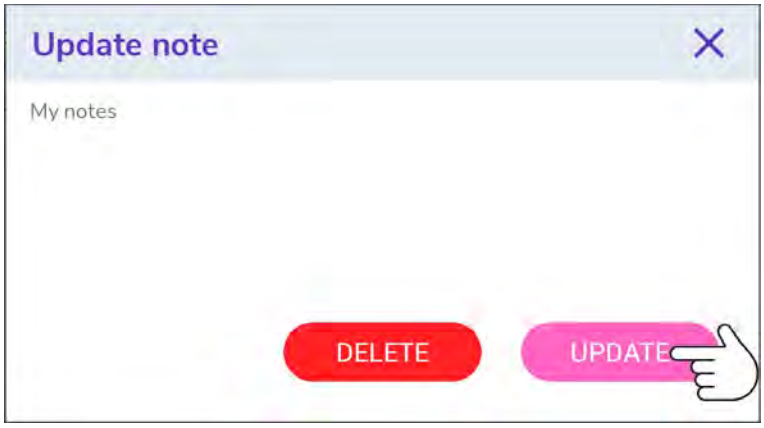
2. To add a new note, select *ADD NOTE*



3. Under *Add a note* > enter your notes for the run, then select *ADD* to save the note



4. To change or delete an existing note, open the note by selecting *ADD NOTE*



5. Enter the changes to the note then select *UPDATE* to save the changed note, **or**



6. Select *DELETE* to remove the original note

9. Troubleshooting Guide

The follow common error messages may be encountered during operation of the instrument:

Error code:	Description:	Probable cause:	Corrective action:
28	Instrument is unable to identify circuit location	The chip may be dusty or scratched	Use a new chip-plate and re-run the measurement ensuring the surface underneath the chip-plate is clean and free of dust. See page 24 If the error persists, contact your local technical support
30	The required pressure of the reservoir could not be reached	Either there is an air leak, or the instrument compressor is faulty	Restart the instrument to reset the system If the error persists, contact your local technical support
39	The labeled molecule is smaller than the size range selected for the run, or the signal measured is too low	An unexpectedly large amount of diffusion has occurred Or the signal intensity is too close to the signal background A measurement error has occurred with one or both outlet ports dry	Repeat the run using a smaller size range. See page 30 Check the signal intensity and if appropriate, increase concentration of the labeled molecule Repeat the run. After the run both outlet ports must contain liquid. See page 17
41	The labeled molecule is larger than the size range selected for the run	An unexpectedly small amount of diffusion has occurred A measurement error has occurred with one outlet port dry	Repeat the run using a larger size range. See page 30 Repeat the run. After the run both outlet ports must contain liquid. See page 17

Contact technical support:

- Through our website: www.fluidic.com/contact-us
- By emailing: techsupport@fluidic.com

10. Cleaning and decontamination

The chip-plate includes a disposable seal to avoid direct contact between the instrument and the samples on the chip-plate, this reduces the risk of contamination within the instrument. In accordance with local protocols cleaning and decontamination of the instrument may be necessary, especially prior to routine calibration, servicing, or shipment.

Contamination on external surfaces of the instrument including the chip-plate loading drawer may be removed by wiping surfaces with mild detergent and non-abrasive cloth, or with disinfectant wipes incorporating 70% isopropanol, 70% ethanol or 10% sodium hypochlorite solutions as required.

CAUTION: Other cleaning and decontamination solutions can cause permanent damage to surfaces.

Make sure that no cleaning liquids get into the USB, ethernet and power supply ports or migrate inside the instrument.

11. Service, maintenance, and fault repairs

If errors are encountered, please restart the instrument, and try running again.

The Fluidity One-M requires a 12-month planned preventative maintenance schedule. All maintenance, adjustments or fault repairs must be performed by Fluidic Sciences staff or an authorized agent only.

To report a fault, request a maintenance visit, for information on service contracts, or to contact technical support:

- Through our website: www.fluidic.com/contact-us
- By emailing: techsupport@fluidic.com

12. Decommissioning and storage

Remove any chip-plates before long term storage.

The instrument should be powered down, cleaned, and stored - contact customer service to order a container.

WARNING: If the instrument is being used in conjunction with hazardous materials or samples, it must be decontaminated before storage, disposal, or transportation as described in Section 10.

About us

It’s not just the proteins that make life, it's the interactions among them. Here at Fluidic Sciences, we make protein interaction analysis easy and robust by developing transformative in-solution technologies and accessible instruments that help scientists quickly and accurately understand how proteins truly interact.

For more information about us, please visit our website www.fluidic.com.